AMATEUR RODMAKING

PERRY D. FRAZER




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AMATEUR RODMAKING



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AMATEUR RODMAKING

BY

PERRY D. FRAZER,

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FOREWORD

IN "Rodmaking for Beginners" I tried to write in a brief and plain manner for the guidance of novices. The temptation to branch off the narrow, straight trail, and give the fullest details in working out the various problems was very great. I have been criticised by some expert rodmakers, but to balance these criticisms I have been told by many novices that they were enabled to follow directions because of their simplicity. The scope of that book was, therefore, restricted; in this one, however, I have endeavored to go deeper into interesting branches of rodmaking for the benefit of anglers who possess more or less skill in working with edged tools.

The army of young—and other—men who are fond of doing things themselves is very large, and growing. To them this book may, I trust, prove to be helpful.

Parts of "Rodmaking for Beginners" are

included in this volume. Acknowledgment is made to the publishers of *Forest and Stream* and *Field and Stream* for permission to reprint in this volume parts of articles which appeared in those publications.

THE AUTHOR.

Ridgewood, N. J., April, 1914.

AMATEUR RODMAKING

CHAPTER I

A REVIEW OF FISHING ROD HISTORY

WHEN we speak of fishing rods to-day, reference is invariably made to those rods that consist of two or three parts fitted with splices or ferrules for greater convenience in carrying to and from the fishing grounds.

Without question the best rod is one made of a single piece, or of strips rent and glued, but with no joint or ferrule to interfere with its resilience and action.

That it is next to impossible to carry a full length rod on trains and in other conveyances is obvious; hence the skill of amateur and professional rodmakers is constantly directed toward the task of making the two or three joint rods as nearly perfect in every way as is possible under the circumstances. That they succeed very well indeed is evident in the beautiful rods now used in fishing and in tournament casting.

For several centuries all of the best fishing

rods were made in Great Britain. There solid wood rods were the favorites; in fact—with the exception of rods made with spliced cane and whalebone tips—the only rods used until a comparatively short time ago, when the rent and glued cane rods invented and made by Americans were adopted abroad. Even to-day solid wood rods are extensively used in Great Britain. Their manufacturers have never been very successful in competing with the best American hexagonal split bamboo rods, and some of their fly-rods are made up from split-and-glued material purchased in the United States and sold as English rods. High grade American split bamboo rods, too, are well known and liked over there.

Hickory has been largely used in England for parts of medium and heavy fly-rods, the material being shipped from the United States and Canada in billet form. Other materials are: Ash, lancewood, whalebone and cane combined; ash and lancewood in combination; willow, blue mahoe, washaba (our bethabara), whole cane, greenheart, and greenheart and whole cane combined. For a number of years greenheart alone, or greenheart in combination with whole cane, was a standard rod material there, but this is of comparatively recent adoption, as angling writers of fifty years ago

seldom refer to greenheart. Alfred Ronalds, writing in 1836, said:

"The best materials are, ash for the stock, lancewood for the middle, and bamboo for the top."

Mr. Ronalds had in mind the whole bamboo which, according to later writers, was first imported into England by army officers returning from India. They, however, looked on it with favor because it was ideal for lances, and perhaps their preference for the thick-walled canes, now called "male" bamboos, led to the belief that was prevalent for many years, that this was better for rodmaking purposes than the thin-walled "female" canes. Exhaustive tests with scientific instruments have proved the thin-walled bamboo better for the purpose.

Theophilus South, in his "Fly-Fisher's Text Book" (London, 1845), prefers ash to willow for butts, hickory for middle joints, and favors tips made from lancewood, cane, and whalebone, spliced together—four and even five pieces in a tip.

The African greenheart, obtainable in the yards of the importers in Stanley Road, Liverpool, is probably much better material for fishing rods than the greenheart sold in the United States, which comes from various places in the

tropics. That which comes through Liverpool is picked over by the British buyers, and our importers must take what is left. This probably accounts for the growing scarcity of first class greenheart. Not a few of our rodmakers decline to guarantee this material, which is most excellent for the purpose when it is good.

Early fishing rod materials in the United States were: Ash and lancewood in combination; hickory, mahoe, greenheart, washaba (bethabara), snakewood, beefwood, cedar, osage orange, shadblow, ironwood, dagama, peppercane, Calcutta bamboo, our Southern canes, jucara prieto, and many others.

Years ago it became a common practice to saw or rive strips of wood, plane these square, glue four pieces together and plane round to form rod joints. The belief was that joints so made were much stronger and less likely to break than would be the case with a joint made from a single piece of wood. This method was followed by splitting strips of bamboo, planing two sides of each strip and glueing four of them together to form a joint, then planing the latter round. This was made possible by placing the enamel side of the bamboo within the strip, as shown by the shaded lines in Fig. 1.



Fig. 1.

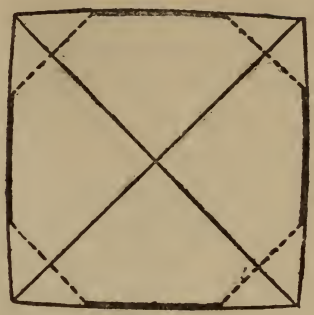


Fig. 2.

The enamel surface being slightly convex, it was difficult to work and glue these strips to form nice joints, and this method, which seems to be ideal in other respects, gave way to one in which the enamel was placed on the outside, and the section made almost octagonal in form by means of planing off the corners, as shown by the dotted lines in Fig. 2. This method is still followed to a certain extent by amateurs in making tips, and for the beginner at split bamboo rodmaking, it has many points of excellence. The principal ones are that it is easier to make a joint of four than six pieces, and if these are carefully fitted, glued and varnished, a fairly good rod is the result.

It is possible the manufacture of these four-strip rods of solid wood or cane, and the difficulty in keeping water out of them with the in-

ferior glue and varnish then available, resulted in the method often followed of winding joints solidly with silk thread or narrow silk tape. This made the rod soft or logy and was discarded finally, to be revived in recent years, and again discarded.

The four-section cane rods gave way to six-strip rods, and these are here to stay. They have been used successfully for the past generation and have outlived their offshoots, the eight-strip, the seven-strip, and the steel-centered single and double-built rods, showing that they are based on very sound principles.

It is the belief among rodmakers that in a hexagonal rod the upper and the lower strips are called upon to perform the greater part of the work of casting and playing a fish, but the strain on the upper strip is supported, not by the lower strip alone, but by the three lower strips, as shown in Fig. 3.

When the greatest strain falls on the lower strip, the three upper strips support it, as pictured in Fig. 4. This seems to be borne out by the fact that in tournament casting—the hardest work a fly-rod is called upon to perform—it frequently occurs that the lower strip is fractured, but the strength of the rod is but little impaired, and turning the rod so that the

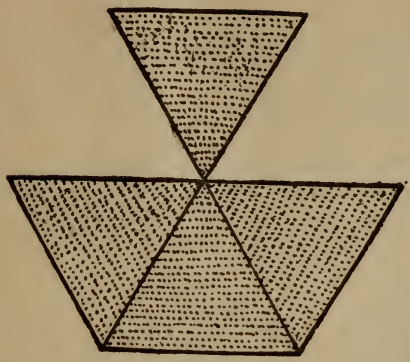


Fig. 3.

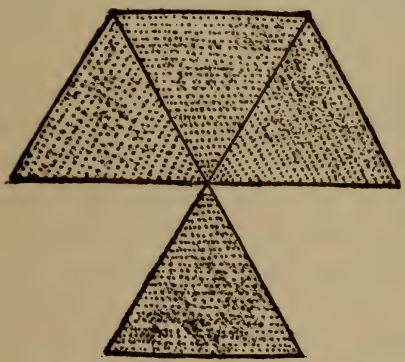


Fig 4.

break comes on the side leaves it in good shape for further use, if the point where the strip is fractured be wound with silk and varnished.

Our English friends, not satisfied with plain

hexagonal split cane rods, have resorted to double built rods, to steel cores, and to winding in double spiral form with ribbons of steel, but while these methods are moderately successful with them, the result is to overload the rod, making it top-heavy or logy. Sectional views of these are shown in Figs. 5 to 9, inclusive.

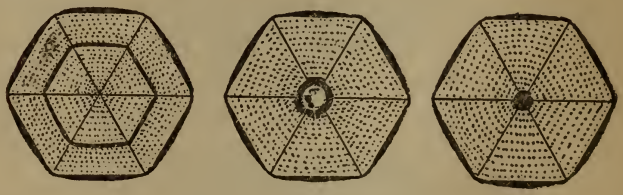


Fig. 5.

Frederic M. Halford,* in his book, "Dry-Fly Fishing" (London, 1902), says of American fly-rods that, judging from those he has seen, they "are too whippy for our insular ideas and seem generally to lack backbone. They are also rather light in the point, the effect of which is to render it difficult if not impossible to recover a long line with them. The fashion of the present day is to use a rod that is slightly top-heavy, and although this is more trying on the wrist, yet, considering all points, is a fault the right way."

*Since the above was written Mr. Halford has passed away. His loss is keenly felt by anglers everywhere.



Octagonal Cane Rod



Nonagonal Cane Rod.
Both Steel Center and Double Built.
Fig. 6.

His preference then was for a rod 9½ to 11 feet long, so it must be assumed that he referred to American rods of light weight. This seems to be true, for he quotes Francis Francis, who, in his "Book on Angling," told of making a cast of twenty-six yards with a 10½-foot rod. No American five-ounce rod of the present time would be accepted as a gift if it failed to lay out seventy-eight feet, and the average six-ounce rod, in the hands of an angler of ordinary skill, will send the fly yards further, if the need arises.

Mr. Halford says there are only three materials worth considering: split cane, greenheart, and whole cane, in the order given. Aside from its fault of occasionally snapping off short, he likes greenheart, but gives double enamel split cane the preference.



Fig. 7.—Steel-Ribbed Split-Bamboo Rod.

I quote Mr. Halford at some length, for of all modern English angling literature his books on "Dry-fly Fishing," "Dry-fly Entomology" and others, and his numerous papers on angling are, to me at least, the most impressive. Among other things, his clearness of expression and his habit of giving more than full credit to his friends for angling hints show his sincerity and fairness.

But Mr. Halford has no patience with steel-centered rods; in fact, he says that the controversy in the English press anent the inventor of the method was a waste of ink and paper, as steel-centered rods were of no practical use. "Consider," says he, "the effect of rigidly fastening the two materials together. The one with the quicker action must of necessity tend to hurry the slower material, and the one with the slower action must equally of necessity tend to retard the action of the quicker material. What must be the effect? A tendency to disintegrate their union. For me," he continues, "they have not cast better; they have not cast



Fig. 8.—Eighteen-Strip Rod.

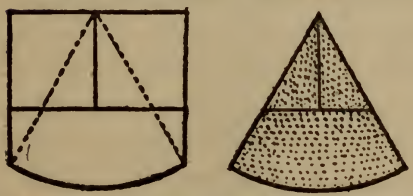


Fig. 9.—Method of Forming Each of the Three-Piece Strips.

more easily; they have not cast more accurately, than the ordinary split cane by the same maker. They are certainly more tiring to the wrist, and when killing a fish I do not think that they give any real accession of power."

In 1889 Hardy Brothers employed an engineer who tested specimens used in rodmaking. All were 24 inches long, .32 of an inch in diam-

eter for round rods, and .16 of an inch on each side of the triangular sections of glued-up hexagonal rods. The tests were for resilience, deflection, number of vibrations before coming to rest with various weights, specific gravity, and breaking strain. The best results obtained, in the order given, follow: Double enamel glued cane, steel centered; double enamel glued cane; hexagonal glued cane, steel centered; hexagonal glued cane; greenheart, built up; hickory, built up; round greenheart; lancewood.

In theory at least it would seem that in a rod wound with narrow steel wires, these would constantly shift with the spring of the rod, relaxing in hot weather and contracting on cold days, the general effect being to shear windings and varnish, and to rust. Certain it is that one of the British firms which adopted steel ribbing some years ago, now advocates a braided silk sheath to cover the steel.

A Frenchman has made rods in which flat steel strips have been let into the wood, and my impression is that a British manufacturer has adopted the invention.

Some years ago a Scotchman invented a similar method, but he used fine piano wires instead, one being let into each of the six strips

and wound with silk. Unfortunately he died before succeeding in his efforts to interest a manufacturer in his work.

In America not much attention has been paid to steel centers or steel whipping for rods. One firm makes a steel center rod, and another one at one time wound both wood and split bamboo rods with copper or bronze ribbons in much the same manner employed abroad in winding with double spirals of steel. I have fished with one of these metal-whipped rods, and must say it has merit, for with it a fly can be cast very prettily, and it is no doubt strong, but to one accustomed to an ordinary split bamboo it has an action which, while pleasant, is peculiarly its own. Without wishing to disparage these methods of strengthening rods, for my own use I prefer plain whipping with narrow bands of fine silk at intervals of three-fourths to one and one-half inches, and believe these are sufficient for any rod of the class generally made in the United States.

As previously stated, attempts to strengthen rods by winding them solidly with silk have been made here during the last half century, but while it is claimed for these rods that they seldom break and will withstand severe strain, I would not advise the amateur to attempt solid

winding. Rods wound solidly with silk on a machine are bound in all places with equal pressure, and if this winding gives strength, as claimed, the strengthening medium is uniform. In winding by hand you will at first lay the silk on with the greatest tension you can exert, but it is tedious work, and after a few minutes your fingers will begin to cramp and ache and you will wind less carefully. When you stop to rest the tension is relaxed, then you resume with vigor, and so on until the long contract is finished. The result must be that the silk is wound so tight in places that it will cut into the wood when the preserving medium causes it to shrink; elsewhere there will be loose spots, followed by tight places—anything but uniform winding, giving you a soft rod.

In this way you may defeat your purpose, yet never know where the real fault lies. Ten to one the wood will be given the blame, as being poor, and you may try the same thing with another rod, to be again disappointed.

It can be said with perfect safety that six-strip split bamboo is to-day the favorite fishing rod material in the United States. More rods of this sort are used in fly-and bait-casting for fish and in tournaments than all other materials combined. They are even replacing solid

wood to a certain extent in salt water fishing. Many great factories have been working steadily to their full capacity for several years, turning out split bamboo rods for the markets of the world, and the best of them have been for a long time and are now far behind with their orders. It is a good trade, that of a first class fishing rod maker; one in which steady employment is certain.

While our British friends are still experimenting with rod materials, using cane and wood and steel in combination, our makers are plodding along with their work, turning out the best split bamboo rods the world has ever known, and satisfying their patrons. In years they have not added to their rods any features of startling importance, but they have instead constantly endeavored to produce perfect rods, until to-day their best rods are indeed works of art, yet powerful and durable withal.

Only one change from the regulation six- and eight-strip rods is prominent. This is a method patented several years ago by the late Fred D. Divine, consisting in twisting the six strips slightly while the glue is still fresh, so that the joints are spiral, the theory being that a rod so treated is stiffened and that the work does not fall on the upper and lower strips alone, but

on each one of the six. The method is highly spoken of by anglers, and I myself have used such a rod with pleasure and satisfaction. At one time I tested two fly-rods that were exactly alike in length, caliber, and weight, one spiral, the other plain six-strip. They were held on a table side by side while a half-ounce weight was suspended from each tip. The spiral rod sagged very little, whereas the other drooped four inches lower.

The steel rod, that has become so popular in the Middle West and South for hard use, is now often employed in bait-casting.

On salt water bethabara, ash and lancewood, dagama, lancewood and greenheart are the favorite materials, although, as stated above, split bamboo is coming into more general use.

In fly-casting there has been very little change in types of rods during recent years, but in bait-casting a complete change has taken place, and to-day the bait-caster's methods are more nearly like those of the fly-caster's than ever before, in that both use artificial lures in preference to live bait wherever success is at all possible. Both are working toward finer tackle and are following more sportsmanlike methods in fishing as a pastime.

Until quite recently angling for game fish in

fresh waters consisted in casting the fly; in casting with medium weight rods and minnows or other live bait, sometimes attached to a spoon or spinner; in still-fishing with minnows, worms, grubs, or other insects; in trolling with live or artificial lures. There were other forms, but these will suffice for the present. Nearly all rods were long and heavy. In order to make one of these, skill of no mean order was required, and amateurs who made attempts were more often disappointed than satisfied.

Then came the change in the methods of using the bait-casting rod. Extremists went from rods of eight and nine feet to those of six, five, four, even less than four feet in length, but as time passed and experience has been gained, many of them have settled on five and one-half or six feet as a very satisfactory length for the superb little rods with which they cast a long line and some form of artificial lure, using a free-running multiplying reel.

It is possible to make these rods as light and almost as graceful as the trout fly-rods. Angle worms and live minnows and doodlebugs are no longer considered necessary by way of lure, and the methods of the bait-caster may be made as cleanly and as skillful as those of his brother of the fly-rod.

CHAPTER II

FISHING ROD MATERIALS

THERE are many anglers who are fond of doing things themselves, and to such of them as fancy bait-casting, the idea of making their own rods appeals strongly. And while it is beyond most of them to make a passable rod nine feet in length, such as was used years ago, there are very few persons possessed of ordinary skill who cannot make a short rod of the type that is popular to-day.

To give assistance to those who would like to try this fascinating pastime is the purpose of this book. I disclaim any scientific knowledge in the art. Rather, I have simply plodded along at the work, making mistakes and correcting them, doing things topside down, perhaps, as a professional rodmaker might say, but attaining the end sought, after a fashion, in time.

During the past decade I have made almost every type of rod, and have worked split bamboo dagama, lancewood, hickory, ash, green-

heart, washaba (bethabara), jucara prieto, and other materials, but in no part of my rodmaking have I had any better facilities for working rapidly and easily than the average busy man commands, hence I feel confident in telling the novice how he can do this and that part of the work, for I am giving the results of my own experience, backed by the sage advice of some of the best known professional and amateur rodmakers and anglers, to many of whom I am greatly indebted for friendly criticism in my efforts to assist beginners.

One thing which this slow and methodical hand work has taught me is this: To take advantage of everything which will simplify the work of rodmaking and finishing. I would have you bear this in mind in reading the chapters that are to come. Some of my methods may seem clumsy to those of you who have access to machine tools, or who may have been advised by professional rodmakers; but the average beginner at rodmaking will work with even poorer facilities, perhaps, than I have commanded, and for him the methods described may be of some value. Above all things I wish to make all steps plain and simple. They are not scientific, but are practical.

It is folly for the beginner to attempt to

make his first rod of split bamboo, or even to obtain glued-up stock and fit it. Instead, he should obtain that material which is easiest to manipulate, and carry the work through to some sort of conclusion. Then, and only then, will he master the first step in rodmaking and begin to realize how easy and yet how difficult it is to make a good rod.

Without question split bamboo is the best material known to-day. If you can obtain the material in butts, joints, and tips, glued-up, so that the "making" consists merely in finishing it and fitting hand-grasp, ferrules, and trimmings, if care is exercised a very good rod will be the result. But I would strongly advise the novice not to attempt to make a split bamboo rod complete; at least not until he has had ample practice in making all-wood rods. Instead, pay a visit to some professional rodmaker, if this be possible, at a time when he is making split bamboo rods, and ask permission to watch him at work for a little while. If you do, my word for it, you will go away a wiser if not a sadder man, for you will be convinced that you lack the skill necessary to finish the six slender strips and fit them together perfectly, even if you can secure bamboo that will prove to be worth cutting up.

This is one of the difficulties encountered in rodmaking, for not all of the material that looks good will be worth the labor of cutting. I know one old rodmaker who, on splitting out his material, tests each slender strip by bending until the ends meet, then examining the circlet for weak spots, and if any appear he smashes the whole piece and tries again—a severe test, but one that will show defects before further labor is wasted. Not that this is the correct test, but it is one of several, the most important one being an examination based on long experience.

Some of the best rodmakers will supply you with glued-up butts and joints, and if you are determined to make your first rod of this material, select these somewhat longer than the joints of your rod-to-be, so that you can pick out the best part of each piece when you come to fitting the ferrules. Take only hand-made stock, for machine made material is not always worth using; much depends on how carefully the stock is selected. The hand-made stock will cost more than you anticipate, but it is much cheaper in the end. If glued-up split bamboo is to be the material, the method of performing the different parts of the fitting will be the same as described further on for all-wood rods.

Next to split bamboo in the woods easily obtainable in the open market comes washaba, or, as it is known in the trade, bethabara. This is a heavy wood, but it is nicely adapted to short bait-casting rods, and one can be made to weigh five to six and one-half ounces, and very slender, that will be exceedingly powerful and full of ginger. Bethabara slightly resembles butternut or a light grade of black walnut in color; with this exception, that when freshly sawed the surface is covered with greenish yellow dust, very heavy and a bit sticky to the touch, giving one the impression that the wood has been sprinkled with yellow ochre. The wood being so hard, the rough saw marks hide the grain, and it is difficult to tell a good piece from a bad one. Look closely at all sides, or better, scrape two sides until the grain will show, and if there are any knots or if the corners show splinters that may be broken off short, discard it and look further. Pound the sticks smartly on the floor and examine for worm holes, which, although very small, are fatal to good material.

I have said that the wood shows dust of a greenish-yellow color, but this seems partially absent in some bethabara. I prefer the grade which shows this characteristic, and which the

English rodmakers call green washaba; but the brown washaba, the grade that does not, is much harder and has a closer and longer grain in the perfect pieces, although it seems more difficult to get perfect pieces in this grade. Hence it is well to stick to the green or dusty grades, which run nice as a rule and can be planed from both ends and on all sides with impunity. Some dealers sell other varieties of imported woods for bethabara, and some try to supply very poor greenheart instead; but reliable men may be depended on to give you what you ask for.

The fine shavings from bethabara are so wiry and tough that a handful of them can be used for a long time in polishing finished joints. They cling together totally unlike those from greenheart, which are short and very brittle.

Bethabara logs are sawed into planks which go to the rodmakers in thicknesses of seven-eighths of an inch, sometimes more. Generally the lumbermen cut logs into pieces seven-eighths by one inch and three feet long, but you can get other lengths. These pieces must be ripped. If, however, they will cut the material to your order, it will be well to have the butt five-eighths of an inch and the tips three-eighths for a two-piece rod. There is a good deal of

cutting before you can be satisfied with the squared stock; and another thing, you must decide which end of your stock is to be the butt, or large end, before you begin the work of tapering.

There are two or three peculiarities about this wood that will astonish you at first. Stock that is cut thin may be very crooked. I have worked pieces so crooked that it seemed a waste of time to do anything with them, but after they were finished and the rod hung up by the top on a brad driven into the wall, all the kinks soon disappeared and the rod became as straight as a perfect arrow.

This method of straightening is advisable with any rod, and especially tips. Where rods are put away in tackle cabinets or closets, with all parts tied up in a cloth partition case, it very often happens that one of the strings of the case is tied more securely than the others, thus bending the tips slightly; and, if left in this shape for long, with perhaps some heavy object resting against all, a very crooked rod may be taken out later on. Even standing joints on the floor with the tops resting against the wall may warp them. Better hang tips up, and the whole rod, too, if practicable. Dealers who handle the finest wood rods often suspend them

all from the tops in cases made for this purpose.

Bethabara as a rule does not warp or take set easily, but cut any wood into thin strips and throw it about and it will warp out of shape. Varnish puts an end to this, as it prevents rapid changes of temperature from affecting the wood easily.

In preparing to work bethabara, put on a pair of overalls or a long apron. The dust is very penetrating and somewhat sticky, and there is an oily substance that adheres to the edge of the plane, dulling it until removed. Wash your hands with soap and water, and you will be surprised to see the water turn a deep salmon color, and the lather from the soap just like so much red paint. No stain need be feared, however, although old rodmakers tell me that after continued working of this wood, their hair takes on a slight pinkish shade, due, evidently, to the action on the bethabara dust on the alkali in the soap.

Dagama in perfect pieces is even more easily obtainable than bethabara, and of all the rod materials known I strongly advise the beginner to make his first rod of dagama. He will have less difficulty in working it, is more likely to get first-class stock of nice straight grain, and it

will give him good satisfaction. Having in mind the disappointing experiences I had in my first attempts to work bethabara, due for the most part to poor material, I asked several of the best known firms of rodmakers for their opinions, and these agreed perfectly with my own, which is that while first-class bethabara will give better satisfaction, dagama of good quality is more easily obtained, can be worked to better advantage by the novice, and will make a good rod.

Dagama comes from Cuba and is rather common. The tree grows to a height of forty or fifty feet and has few branches. As a rule it comes in billets six or seven feet long, split from the log, but as these are not expensive, the novice who expects to make two or three rods can use the best part of a billet to advantage. The wood is rather white when first split, but exposure to the air turns it pale yellow and it darkens slightly when made up into rods. It resembles lancewood so closely that unless pieces of both are placed side by side it is difficult to tell which is which. Its grain is closer and straighter than that of lancewood, however, and it has none of the pins or knots that characterize lancewood and make that wood so unsatisfactory to work. Dagama is

light, stiff, and elastic, breaks with a long, splintering fracture, somewhat like hickory, is easy to work with or across the grain, and may be highly polished. Ferrules slightly larger than those used on bethabara will answer.

It has been said that dagama is at its best in a moist climate, and is therefore peculiarly adapted to use on salt water; that it becomes somewhat "brash" in dry climates, like hickory. I regret that my personal experience with the wood is confined to regions near the sea level, and that I cannot affirm or deny this statement. Hickory, I know, although exceedingly tough and resilient as a rule, failed completely when used for the long whip stocks of the old-time stage coach and army ambulance drivers in the dry regions of the Southwest. Although soaked with oil, they were totally unreliable after drying out, and would snap short off like reeds. Bait-casting rods are not used in such dry regions as a rule, but along the Pacific coast, it seems, bethabara gives better satisfaction than either greenheart or dagama. The best fishing is in the dry season there.

The late Henry P. Wells was one of the first angling writers to mention dagama, and he praised it very highly, both in the first edition of his "Fly-Rods and Fly Tackle," which was

published in 1885, and in the second edition, which appeared in 1901. Of dagama he said:

"Compared with a stick of approved greenheart of equal size the dagama showed no inferiority that I could detect, while it was certainly much lighter. . . . I have made and used several rods made of dagama, and have seen many made by others. If well selected and well seasoned, as a rod wood it is difficult to equal, much less excel, as far as my experience goes. It is very strong, very elastic, considerably lighter than any wood I know of which has equal strength, and works with a keen tool in a way that is simply a delight."

The late John Harrington Keene favored four varieties of wood for rods, after split bamboo. These were snakewood, lancewood, greenheart, and bethabara. Snakewood, in his opinion, was the best where weight was not important, as for bait-casting rods. "It is," said he, "one of the most satisfactory woods to work that I know, cutting smoothly and without apparent grain, and coming out from the plane with a surface like ivory for smoothness. Greenheart is a much harsher wood to work, but if the tool is keen it works fairly well. For fly-rods it is one of the best woods I know, being of medium weight and great stiffness."

Of dagama Mr. Keene said: "While it is tough, it lacks the rigidity of lancewood and is inferior to it for rodmaking. Lancewood, which, if well selected, is a most desirable wood for rods, is one of the easiest woods to work, has little visible grain and cuts smoothly."

It seems, however, that Mr. Keene's opinion of split bamboo changed after he came to the United States to live, for when he wrote "Fishing Tackle, Its Materials and Manufacture" (London, 1886), he said: "The jungle canes are of Asian growth, and are chiefly utilized for the glued-up cane rods which are so popular—rather undeservedly, I think."

At that time Mr. Keene pronounced greenheart "the very best all round material for all the joints except the butt of fishing rods of whatsoever description."

Curiously enough, he says "the beautifully mottled appearance of a well finished cane rod is produced by staining the wood with aqua fortis and nut galls. The stain is burned in immediately it is put on." Evidently, if this was true, the rodmakers of that time used other canes and attempted in this way to imitate the Calcutta canes.

Lancewood is used more than any other material for all-wood rods in America, al-

though it does not seem to be very much used abroad at present. In England greenheart is more of a favorite, but over there more attention is given to combinations than here. For example, hickory is frequently used for butt joints in high grade rods, whereas on this side of the water it is put into the cheapest ones, imitations of bethabara, stained, and for spring butts of surf rods. Over there, too, whole cane butts and even middle joints, with greenheart tips, are common, while as a rule we stick to one material throughout the rod.

Lancewood is more easily obtainable than bethabara. The latter comes from Africa by way of Liverpool, whereas lancewood in large quantities is brought up to New York by the coastwise vessels trading in Southern waters. It costs less than bethabara, and is much easier to work. It is not so heavy as bethabara. In the rough it is easier to select good stock than is the case with bethabara. But it is "softer" and more resilient in equal diameters, and has not the steely snap and quick recovery that characterize the other variety mentioned. In addition to this it is prone to take set; in other words, to warp permanently, and this fault is more marked on damp than on dry days.

There are so many varieties of wood avail-

able, and all more or less excellent for rods, that the beginner may be tempted to try others than those recommended. But my advice is that he confine his first experiments to either dagama or bethabara. Then, after he has acquired some knowledge of squaring, rounding, and finishing solid wood, and fitting hand grasps, ferrules and tops, he may feel safe in making a split bamboo rod, since this will be the goal of his ambition.

Good Calcutta bamboo is very difficult to obtain. Japanese bamboo is inferior to it, and I would not advise its use. Nearly all of the Calcutta bamboos are marked with alternate bands or patches of natural and scorched enamel. Two varieties are commonly known. The so-called "male" bamboo has thicker walls than the "female" and is generally chosen for this reason. Careful experts tell us, however, that in this thick-walled bamboo the strength diminishes more rapidly from enamel surface to hollow center than in the thin-walled bamboo. The enamel or rind is tough and hard. Under this the cells increase rapidly in size and their walls diminish in strength, the inner part being more pith-like than in the thin-walled bamboos, whose cells are smaller and their walls stronger.

Various reasons are given to account for the burning of the bamboos by the natives of India. The late Henry P. Wells, who studied the question carefully, gives six reasons, as follows: A religious ceremony; roasted over a gridiron to kill borers; also to burn off adhering leaves and vines; for ornamental purposes; accidentally burned in firing jungles to destroy creeping vines; seared with hot irons in straightening. He leaves it to his readers' fancy to decide.

J. J. Hardy, himself a rodmaker, in his "Salmon Fishing," says the natives lay the more crooked canes in fires made of grass and leaves, to soften before attempting to straighten them. "While this firing doubtless solidifies the sap and hardens the cells greatly," he writes, "it destroys fully 50 per cent. of the bamboos for rodmaking by burning through parts of the outer skin, the effects of which may be seen in the very dark blotches. Where this appears the material is worthless, all the original structure having been destroyed. It has been very difficult to persuade the natives to adopt special methods of heating for the purpose of straightening, in order to avoid this overburning; but it is satisfactory to know that better methods, under strict supervision, are now being employed." Mr. Hardy says it is

not unusual to split up thirty to fifty culms and test the strips before sufficient good material for an 18-foot salmon fly-rod is obtained.

The bamboos obtainable are generally 1¼ to 1½ inches in diameter at the large end and only four or five feet of each one can be used to advantage.

Tonkin canes come from the province of that name in French Indo-China, on the Gulf of Tonkin, an arm of the China Sea. Probably most of them are cut in the valleys of the Black and Red rivers, which lie due east of Mandalay in Burma, and as Calcutta and Tonkin canes grow in the same latitude, this may account for the belief held by some that Tonkin canes equal Calcutta bamboo for rodmaking purposes. It is, however, a fact that very few professional rodmakers will admit that anything can equal first class Calcutta canes. A veteran says one reason why he is inclined to use Tonkin is found in the fact that good Calcutta canes are very difficult to obtain, and with them there is so much waste.

Many of the Tonkin canes furnish thicker material than the other variety, and if properly seasoned and selected, make excellent fly- and bait-casting rods. Few of them are burned, which furnishes another reason for their popu-

larity. Some are stained unevenly before they are split, and when the strips are matched and glued these mottled places appear here and there on the rod, giving the effect that is so pleasing to anglers of the old school who, through custom, prefer the mottling to the white enamel of unburned canes. The staining is a harmless process, and may be produced in several ways.

Tonkin differs materially from Calcutta. The nodes or knots are smaller and less troublesome, and in the rough beveling you can plane through the knots with safety. This cane is much coarser than Calcutta, harder, and in breaking a strip the surface gives way in long splinters, leaving softer pith strata which are tough but not springy. Because of its greater stiffness it is used for tournament rods. It resembles somewhat our Southern canes, but its surface is darker and the fibers reddish. It is harsh and glassy, soon dulls the edge of the plane, and must be handled carefully or the hands will be cut and scratched.

It does not follow that, because some rods are made with double enamel, it is the better method. If first class bamboo is used, and the strips are well made and perfectly fitted, nothing can surpass the plain hexagonal rod; but

the difficulty of obtaining good bamboo is great and is increasing, and it is not always possible to get material thick enough to make perfect triangular sections without resorting to the double enamel process in butts and joints. Many rods are now made the centers of which are hollow because of this difficulty of getting material thick enough to make all strips perfectly triangular in section.

In an attempt to choose between double enameled hexagonal bamboo and octagonal bamboo, the former may safely be given preference. In an octagonal rod the butt and middle joint are stronger, provided the caliber is large, but eight-strip tips consist of so much glue and so little cane that they will not withstand so much hard usage as will the six-strip

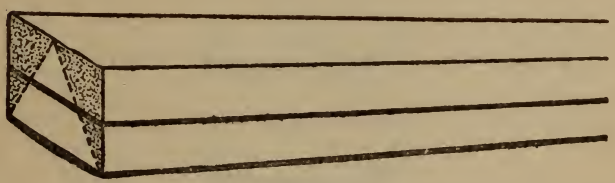


Fig. 10.
Dotted lines show section for double enamel hexagonal rods.

cane, and frequently give way at the ferrules, particularly if the parts are carelessly twisted.

On the other hand, the gluing of double enamel hexagonal strips is partially protected from moisture, and if properly made a double enamel rod is strong and powerful. Besides, this method is a simple one, and double enamel strips are easily made in several ways, the common form being to plane two strips of rectangular section, glue them together and then file as in a single strip; the other to make a strip of triangular section, then plane off the apex of the triangle, glue another strip to the base, and file this down.

In Fig. 10 the dotted lines show the form of the completed section, and the shaded lines

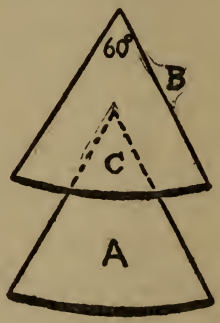


Fig. 11.
As finished sections of double enamel strips appear.

the enamel. In Fig. 11, *a* is the outer strip with apex of triangle planed off; *b*, second strip

glued to *a;* dotted lines *c* indicate section of finished strip.

The specific gravities and weight of various woods mentioned are given by Mr. Wells as follows, the standard being distilled well water:

Snakewood	1.3718	85.74
Bethabara	1.2140	75.88
Greenheart (dark)	1.0908	68.18
Jucara prieto	1.08	67.30
Lancewood	1.0335	65.49
Six strip split bamboo	.9915	61.96
Four strip split bamboo, enamel inside	.9678	60.49
Greenheart (light)	.9643	60.26
Dagama	.90	56.10
Hickory	.7963	49.77

CHAPTER III

MOUNTING AND FINISHING MATERIALS

WHAT shall the handgrasp be—solid cork or a form wound with cord? Simplicity, effectiveness, and economy point to cork. This statement may surprise you, but it is true. Cork, seemingly difficult to work, only requires proper treatment, and with it the weight of the rod can be kept down.

The cork companies in New York, Pittsburgh, and Chicago will furnish handgrasps to order ready to slip over a solid center. These are made either of solid cork discs or of suberit, a composition of ground cork and cement. They will also furnish corks similar to those used in vaseline bottles and one-half inch thick, at about seven cents per dozen for the best quality. I generally purchase four dozen at a time, costing twenty-five cents, and select the best ones for use. The 1¼ and 1⅜-inch sizes are best for rod grasps. Some tackle dealers now keep rodmaking supplies in stock, and will supply partly finished handgrasps.

Wood forms for handgrasps can be purchased from rodmakers in various lengths and sizes, with either single or double grasp, and with a hole of any size desired bored clear through. They cost twenty to forty cents. If you can have access to a lathe, however, it will be a pleasure to turn your own handgrasps from staghorn sumach, which you can obtain in almost any thicket during a walk in the country; or white pine. Bore the hole first, fit a plug in this, center the ends, and shape the outside to suit, bearing in mind that the cord to be wound on will increase the diameter about 1-16 inch.

Cord for this purpose is obtainable from fishing tackle dealers. Light green braided cotton cord looks nice when varnished, and makes a good firm grasp, but it is inferior to cork.

All ferrules, reelseats, tapers, and buttcaps should be German silver. These cost a trifle more than brass nickeled, but they are harder, stronger, and more durable. Besides, nickel glitters while German silver tarnishes just enough to become slightly dull, but is not injuriously affected by the presence of chemicals in the water.

There are only three types of ferrules that

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merit the consideration of the beginner. These are:

1. For split bamboo rods, welted and capped (or shouldered) ferrules, with the caps serrated so that the silk may be wound over the springy saw-tooth like ends illustrated in Fig. 12. The reference letter *a*

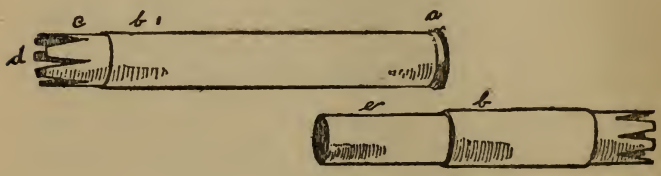


Fig 12.—Serrated Ferrules.

shows the welted end of the ferrule, which protects and strengthens it; *b* is the cap or shoulder, which is turned down slightly at *c* to permit winding with silk, which should extend 1-16 inch beyond the flexible serrated ends *d* and bind the ferrule rigidly on the wood; *e* is the center, or slide. The caliber of a set of ferrules is taken at the the point indicated by this letter. The outside diameter of the center at *e* is exactly the same as the inside diameter of the ferrule.

2. Capped and welted ferrules with the caps split and also turned down slightly for

winding, as illustrated in Fig. 13. The refer-

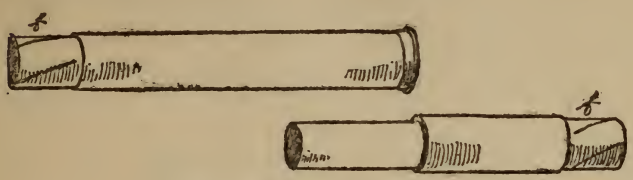


Fig. 13.—Split Ferrules.

ence letter *f* shows the capped ends turned down so that the cap and the silk winding will be the same diameter. This end is split in several places with a very fine saw, so that the silk will bind the ferrule in the same manner as with serrated ferrules.

These split ferrules are excellent for split bamboo rods, or in fact for any rods, and they are often preferred to serrated ferrules. If anything they are neater. They can be purchased of the trade, but any amateur who can work metal handily can make them from plain capped ferrules.

3. Capped and welted ferrules are of the same form as the two mentioned above, but the caps are plain, as shown in Fig 14.

In all carefully made German silver ferrules the outside diameter of the female ferrule at *g* (Fig. 14) is identical with the inside diameter of the cap at *h*. This is a help to the

novice in tapering his joints. This also applies to the center. In purchasing ferrules always specify "capped and welted ferrules, closed-end centers." Some of the centers are left

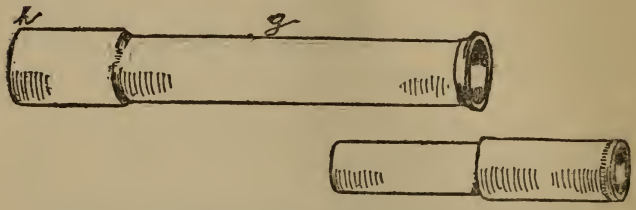


Fig. 14.—Plain Capped and Welted Ferrules.

open at the bottom, which is necessary when dowels are to be put in.

I have given preference to capped ferrules for the reason that they are better for the novice to work with than straight ferrules. By straight ferrules I mean those in which the female is a true cylinder inside and out. Many serrated and split ferrules are made straight, but if they are not to be fastened with pins, they may be set too far down on the wood and work loose more easily if the cementing is imperfectly done. It is possible to obtain straight ferrules which are shorter than those that are capped. For three-joint rods less than six feet in length, by using short straight ferrules, you can slightly lessen the total

length of metal in the rod, and if it is to be quite willowy, they are excellent for the purpose. Specify either "welted straight ferrules" or "welted short straight ferrules" in ordering, but in either case add "capped closed-end centers." The use of straight centers will spoil the taper at the joint.

Dowels should be avoided by beginners. The plain ferrules have, through long use, been proved fully equal—and in the opinion of most anglers, actually superior—to doweled ferrules, even for heavy salt water and salmon rods. In this opinion I do not concur with respect to very heavy rods, in which there is abundant space for the dowel without weakening the wood at all. For small caliber rods, however, the dowel has no advantage over the plain ferrule. Few amateurs can hope to properly fit doweled ferrules to a rod, the effect being rather to weaken than to strengthen it. The intricate parts of the old-fashioned doweled ferrules may be seen in Fig. 15.

Every ferrule should be fitted with a metal plug, to keep out the dust while it is in its case.

Waterproof ferrules are well worth their slight extra cost. In these a metal disc is brazed or soldered in the ferrule, to prevent

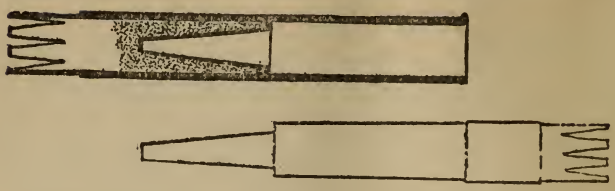


Fig. 15.—Sectional View of Doweled Ferrule.

water from getting into the wood or bamboo.

In purchasing a reelseat it is necessary to decide whether the rod is to consist of one piece; of a tip and a separate handgrasp; or of two or three joints of equal length; and in any case whether the grasp is to be single or double.

If the rod is to be one piece, or if the handgrasp is to be fitted direct to the butt of a two- or a three-piece rod, and is to be single, the reelseat should be like that pictured in Fig. 16.

If the handgrasp is to be single and separate, then the ferrules shown in Fig. 17 will be needed. Of these, the center goes on the large end of tip and the ferrule fits into the tapered end of the reelseat (Fig. 16). The method of fitting will be described further on.

If the handgrasp is to be double, then the reelseat is ordered without the tapered end, and a separate taper is required. (See Fig.

18.) The ferrules shown in Fig. 17 can also be used in connection with this reelseat (Fig. 18), as will be explained in the proper place.

For all single-hand fly- and bait-casting rods reelseats of three-quarter inch diameter are standard, and seven-eighths or one inch for medium weight salt water and salmon rods. In ordering reelseats, the diameter of the small end of the taper must be specified. Generally these are 15-32, ½ inch, 17-32, and 19-32 of an inch.

Reelseats for fly-rods are like Fig. 18, with the exception that the bottoms are closed. For this purpose the taper is generally narrower.

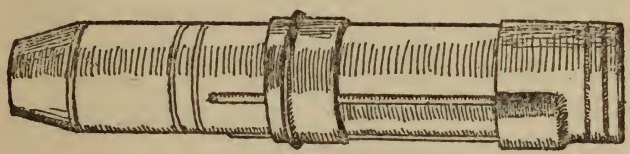


Fig. 16.—Reelseat for a Single Handgrasp.

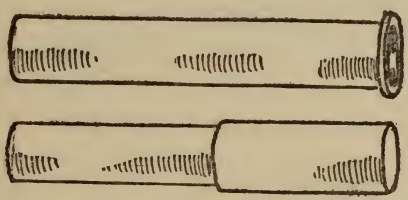


Fig. 17.—Ferrules for a Separate Handgrasp.

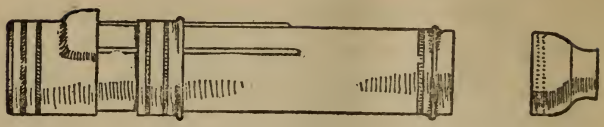


Fig. 18.—Reelseat and Taper for a Double Handgrasp.

Stock buttcaps are generally of ¾ inch diameter at the large end. For bait-casting rods, which should have rather full grasps, one inch



Fig. 19.—Agate Guide.



Fig. 20.—One-ring German Silver Guide.

is a better diameter. I like the small hard rubber buttons made for tarpon rods, and hollow these out so that they fit as a buttcap. They can, however, be fitted flush against the cork of the handgrasp without hollowing, and fastened on end of grasp with a screw.

For light bait-casting rods it is nice to use

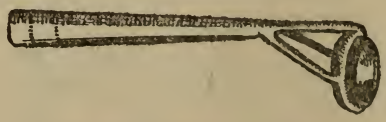


Fig. 21.—Agate Offset Top.

a full set of agate guides and an agate top, but if this increases the cost too much use an

agate top and an agate guide nearest the reel, with one-ring German silver guides for the balance of the set. There was a time when it was believed that large guides and tops were best, but it is now conceded that guides and tops of a caliber of 5-16 inch are large enough, safer, and neater. There can be no question that large, heavy guides affect the action of the rod. The agate guide shown in Fig. 19 and the one-ring German silver guide pictured in Fig. 20 have proved as good as any so far



Fig. 22.—Hard Steel Snake Guide for Fly-rod.

used. They are light, strong, and efficient. The caliber of both is 5-16 inch.

By all means employ an agate offset top made like that shown in Fig. 21. In this there is a wire extending from the tube to the bottom of the metal ring holding the agate, while the two side wires prevent the line from catching around the top, and strengthen it. The tube may be tapered or cylindrical.

For fly-rods the best guides are of hard steel, snake form, as shown in Fig. 22. These can be had in various sizes in the trade. In Fig. 23 a steel top for fly-rods is shown. In this

the ring is of the same form as the agates used for the same purpose, but the steel ring is made loose enough to turn in the wire that holds it, in order that it will not wear from the constant friction of the line. The wires are lashed to the rod tip with silk. The form shown in Fig. 24 differs only in that these wires terminate in a tube. Wires and tube are German silver.

For guides and tops of fly-rods German silver is too soft and is soon cut in grooves by the friction of the line. Any mechanic can make these loose steel tops, or they can be purchased from the importers. Agate or steel tops, and steel guides, are necessary for tournament fly-rods. The hand guide should be agate, steel, or phosphor bronze, as during the constant stripping in and shooting of the line it is held at an angle to the rod, causing considerable friction and wear on the first or hand guide.

Novices who have access to machine tools can make guides and tops for both fly- and bait-casting rods of hard steel and of the form shown in Figs. 19-24, inclusive. Steel is in every way adapted to guides and tops, and if neatly made they are light, strong, and durable. Many novices make all of their rod fit-

tings, and some of these are the best I have ever seen. Being unable to purchase steel tops for my single-hand and salmon fly-rods, I persuaded a fellow angler to make several steel tops for me, and these have proved very satisfactory in tournament casting, He has also



Fig. 23.—Steel Fly-rod Top, with Loose Ring and Wires.



Fig. 24.—Steel Fly-rod Top, with Tube.

made steel guides and tops for all his fly- and bait-casting rods, and his work shows what a novice can do if he has access to machine tools. I prefer phosphor bronze for the fly-rod tops. Agates are too easily broken.

Perhaps the best glue for use in the making of split bamboo rods, and for gluing corks and forms for handgrasps, is French glue, obtainable in paint shops. Place the glue pot in a kettle of water over a slow fire. The glue pot should have wire legs or be elevated slightly, else it will rest on the bottom of the kettle and, the water being excluded from under the glue pot, the glue will burn.

Russian isinglass is also very good, but it should not be used a second time. Instead, clean the pot and prepare fresh glue each time

it is to be used. Russian isinglass is colorless and for this reason is used in glass signs and metal work where other substances would show. Purchase an ounce of it and try it before deciding to adopt it. It costs about forty cents an ounce, but this quantity will be sufficient for several rods.

Much depends on how glue is prepared and used. I prefer Coignet No. 1, the best French glue, soaking it overnight in cold water, then using it very hot but thin. It sets very quickly but is not brittle. Like all amateur rodmakers, I have made mistakes in handgrasps, etc., and have tried to rectify them by heating, steaming, or soaking them, to separate the parts so that changes might be made. It is at such times that one learns with what obstinacy glue will resist attempts to separate parts joined with it. I have soaked a cork handgrasp for three hours in steaming hot water, without making the slightest impression on the glue, and have experimented with ordinary glue and prepared cements, all of which resisted severe treatment in a manner that surprised me.

There are several prepared cements that are excellent and cheap. All should be warmed, say in a cup of hot water. Most of them can be thinned with vinegar. They are perhaps

inferior to the commercial glues that are soaked and prepared fresh each time they are to be used, but their handiness appeals to the novice.

Much depends on how the glue dries in split bamboo. It should not become brittle and break when the rod springs, nor be too sensitive to moisture.

Ferrules can be seated with shellac, glue, or various cements. I have found the cement known as Hercules very satisfactory. It is obtainable in the trade in twenty-five cent sticks. A very good article, known as the *Fishing Gazette* ferrule cement, can be made as follows:

Clear rosin, 1 ounce; boiled linseed oil, 1 teaspoonful; gutta percha, 1 drachm. Melt together, pour into water, and pull.

I have used silk wax with satisfaction made after a formula given by the late John Harrington Keene. It is as follows:

Best yellow rosin, 2 ounces; white beeswax, sliced, 1 drachm.

Dissolve by slow heat and add 2½ drachms fresh unsalted lard. Stir for ten minutes, pour into water, and pull. It is to be wrapped in a bit of chamois skin and kept out of the dust.

In this, as in the ferrule cement, it is well to rub your hands slightly with vaseline before

taking the wax out of the cold water, as otherwise it will adhere to the fingers at first.

Another formula, which is recommended by Colonel R. F. Meysey-Thompson, in his "Angling Catechism," follows:

Powdered white rosin, gum arabic, and lanoline, one part each; or two parts rosin and no gum arabic. Simmer together until melted, add a few drops of essence of lemon, pour into cold water, pull and roll until of the proper consistency, when it can be cut into cakes and wrapped in chamois skin. If too soft, add rosin; if too hard, add lanoline. Obviously it must be kept free from dust.

The best colorless substance obtainable for use in waxing silk thread for winding rods or making artificial flies is mentioned by the late Harry G. McClelland in his excellent little book "The Fly-dresser's Cabinet of Devices." It is made by melting together equal parts (bulk) of amber rosin and turpentine and pouring into collapsible metal tubes such as artists use. When a thread is to be waxed, a little of the liquid is squeezed out of the tube on the finger and thumb, between which the thread is passed several times. The surplus wax is then removed from the fingers with a drop of turpentine. Fly-tyers use this liquid in preference

to the silk wax mentioned above, as the latter is more likely to get hard and brittle in time through exposure to the air, and it is difficult to keep it clean and colorless.

You will need a small bottle of the best grain alcohol shellac for coating all silk windings to preserve their original color. This is not to be used on the rod proper, however.

The best varnish I have ever used on rods of all kinds is known as extra light coach. It comes in cans of all sizes fitted with air tight tin caps. It is better to get the smallest size, one-half pint, as when repeatedly exposed to the air it dries slowly unless thinned with turpentine, and this color makers invariably advise you not to do, as the thinning agency detracts from its good qualities. Instead it should be heated in a vessel of hot water. This varnish is elastic, does not crack, and dries quickly with a beautiful gloss if used while quite warm.

Spar varnish is also good, but several coats of it are required, it lacks luster, and dries slowly unless exposed to sun and wind.

Purchase a three-quarter inch oval or flat brush of good quality for the varnish, and a thin, round artist's brush for the shellac. Both should be washed carefully immediately after

being used in hot water and soap, then dried and laid away out of the dust.

Amateur fishing rod makers experience difficulty in obtaining silk of suitable sizes for winding their rods. Those who live in small towns can only obtain size A or larger, which is too coarse for fly-rods and for the slender bait-casting rods used so much in bass fishing and in tournament casting. No silk finer than A is carried by dry goods firms, but in this size every imaginable color and shade may be had.

To be sure, some of the fishing tackle dealers carry O and OO in red, green, yellow and black; but if one is particular and asks for a certain shade, the dealer does not always have it, and the next shade may prove disappointing if you happen to have part of your winding finished and desire a shade that will match nicely. The wholesale silk houses will not sell to an individual in small lots as a rule, although they may sometimes condescend to let him have a given number of spools. No amateur could possibly use a quantity of silk, even if he were to wind every one of his rods solidly with it, and after several disappointments he is likely to fall back on A, even if it does finish up in

lumps and welts that are not in keeping with the careful work he has put on the other details of his rod.

There is one advantage in size A, however: every little store handling dry goods carries all colors and every shade that will match dress goods of silk, cotton, or wool. If you have never noticed this, ask a saleswoman for a spool of green silk, and she will show you a score or more, and every one a different shade of green. No wonder you cannot buy silk by mail that will suit you, merely by naming a color. How this size can be split and used for all windings is described further on.

In selecting silk there is always the temptation to purchase more than you can ever use or give away, particularly shades that will disappoint you if wound on the rod and varnished. There are certain combinations that do not give the barber-pole effect so many anglers object to, yet are durable as to color. Black is a hideous color for a nice rod, but it looks well as borders for yellow or orange. Some shades of yellow lose all color under the varnish, and cream color becomes semi-transparent, and is often employed for that very reason. Blue, lilac, and pale red fade rapidly when exposed

to the sun, and purple, often seen on some rods, is not always lasting. Bright or flame red and medium apple green are generally satisfactory, but their brilliancy depends a great deal on what sort of varnish protects them from the wearing of the line in casting—particularly on a fly-rod.

In addition to the winding silk, purchase a tiny spool of buttonhole silk of any color, to be used in pulling the ends of the winding silk through and forming " endless " windings. Its use is explained in the proper place.

A spool of cotton or linen thread is also handy for use in tying guides on temporarily while testing your rods. If it is waxed it will be much more effective. I use linen for this purpose, fastening the guides in place with it while aligning them, then cutting the thread when the guide is partly fastened with silk.

CHAPTER IV

TOOLS NEEDED IN RODMAKING

IN preparing to make a fishing rod, after the wood and metal parts have been obtained, the next thing to consider is a workbench. If one is not at hand, and you do not know any carpenter or mechanic who will let you use his bench at odd times, a makeshift will answer. If a bit of plank can be laid across a table and secured against wobbling, it will serve.

Of course a large iron vise will be very useful, but if this is not available, one of the little iron vises to be had in hardware stores for a dollar or less will answer very well; in fact, you cannot afford to be without one if you are fond of making and repairing small articles.

The tools you will require are few and simple. At least two iron planes will be needed, one of medium size and the other very small, say four inches long, for finishing. Get a small oilstone in a wooden case, and never neglect to clean it carefully and wrap it in a cloth after

using it, as otherwise its pores will become clogged with gummed oil and dust, rendering it worse than useless.

You will need one rather coarse flat file, say fourteen inches long, and a fine flat or three-



Fig. 25.—Micromeetr Caliper.

cornered file, the latter preferred for split bamboo work. Also get a sheet of fine emery cloth; coarse, medium, and fine sandpaper; a small, thin saw; a flat steel scraper. A drill stock and several small drills are always useful.

Calipers of some sort are necessary. The best obtainable is the micrometer caliper registering thousandths of an inch, with scales showing equivalents in 8ths, 16ths, 32ds, and 64ths. One of these costs about $4, but its graduations are so fine that it is useful in other work as well as in rodmaking, and is almost indispensable for the angler who wishes to obtain exact calibers of rods, lines, silkworm gut, etc. These calipers are made by several firms, and all are of the form illustrated in Fig. 25.

The size which is graduated in thousandths, and will take work up to an inch in diameter, is best for your purpose.

The next best caliper is the one shown in Fig. 26, or a similar device with sliding arm and scale graduated to 64ths and opening two inches. This is the most practical caliper for the beginner, as it is simple and small. Its cost is about $1.50. It has a lock nut and the reverse side gives 100ths of an inch.

A much cheaper gauge is made of brass and boxwood, similar in form to Fig. 26. One of



Fig. 26.—A Simple Form of Caliper.

these will answer very well, although the graduations are coarser than those of the other calipers mentioned.

There are several devices that are used by some amateur rod builders which are not absolutely necessary, but they are handy and can be made to take the place of calipers at times.

You will not make your rod a true taper from handgrasp to top, but it will help you to know how to do this, for the tapering of the

square stock can be made nearly uniform at first, in the rough.

Take a piece of cardboard and draw two straight lines 4½ inches long, 15-32 of an inch apart at one end, and 7-64 of an inch at the other. This represents a uniform taper from the handgrasp to the top of a 5½-foot rod. Mark off spaces every half inch to represent every six-inch station from handgrasp to top, and number them 6, 12, etc., up to 54. The distance between the horizontal lines at every mark will give the caliber of the rod at that point; that is, the length of the mark numbered 24 will be equal to the diameter of the rod 24 inches from the handgrasp, if the

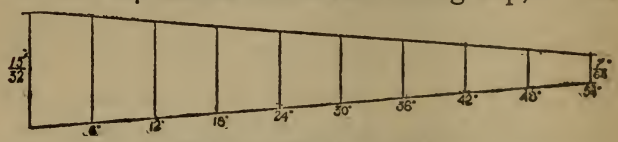


Fig. 27.—Taper Gauge.

taper is uniform. Fig. 27 explains the method. To make the diagram handier, let the horizontal lines be 9, 18, or 36 inches long, dividing the total into nine spaces of equal length, the result being alike in every case if the distances at the ends are exactly what the rod is to be at taper and top.

Now, take a piece of brass and by sawing first and trimming with a file afterward, form a slot 4½ inches deep, 15-32 inch wide at the top, and 7-64 inch wide at the bottom. Every half inch scratch a line across and mark these 6, 12, etc., with a sharp-pointed instrument. This will serve as a gauge for uniform tapering.

If, however, you have decided what the caliber of your rod is to be at every six-inch station, you can utilize a piece of brass with ten square notches filed in its edges, the largest being 15-32 inch and the smallest 7-64, every notch to be equal in width to the caliber of the rod at the corresponding station. These can be numbered from 6 to 54, respectively, in half feet.

For smoothing off rough places on metal fittings, taking the sharp corners off guides and many other little details, a fine three-cornered file will be very useful. I prefer the needle file because it will fit into a loop in the cover of my fly-book, and it can be used in lieu of a saw on occasion. A file of this sort is about six inches long, flat on one side, and slightly convex on the other. Its width is about one-eighth inch in the center, tapering to a fine

point. Although somewhat delicate, its high tempering prevents frequent breakage, and it can be used on rod fittings without scratching more than with emery cloth.

CHAPTER V

TYPES OF BAIT-CASTING RODS

TO some persons it may seem that while an eleven-foot rod must be nicely tapered and balanced, a rod only half as long, being more or less stick-like, if made a given caliber, will answer. Nothing could be further from the truth. While it is a fact that a rod 5½ feet in length requires less time and material than one of the old-fashioned long bait-fishing rods, it must be even more carefully made, for an error of one-sixty-fourth of an inch in the caliber of butt or tip may render it comparatively worthless. A mistake in the long rod may be hidden in its greater resilience, and this may save it, but reduce the length by one-half and you more than double the work required of each foot.

For a long time after I first began to experiment with the modern bait-casting rods I felt sure that, for an all-round rod one of six feet or slightly longer seemed preferable to those of lesser lengths. Exhaustive experiments with

rods of various lengths and with reels and lines, in fishing and in tournament casting, have convinced me that if we make our bait-casting rods as delicate, relatively, as our fly-rods, and still retain ample resilience, strength, and backbone, 5½ feet seems a very good average length.

Numerous well-known advocates of short rods have arrived at the same conclusion. So well known are they that their advice seems worthy, especially as their conclusions have been proved sound by the vast number of 5½-foot rods used in the national casting tournaments and in bass fishing.

Sometimes it is said that the modern bait-casting rod, like the long bow of merry England, should be proportioned to the owner's height and strength. There may be something in this, but I would hesitate to assert that a six-footer should select a rod of his height, and a man of medium stature one of five feet.

Who was first to advance this theory I do not know, but Alfred Ronalds, in his "Fly-Fisher's Entomology" (London, 1836), said of salmon and trout fly-rods:

"Like the bow of the archer, the rod of the angler should be duly proportioned in dimen-

sions and weight to the strength and stature of him who wields it."

Possibly a short man may get better results with a five foot rod than with one of six feet, but there is little to recommend any rod shorter than five feet, since it must be stubby if badly proportioned, or weak if of too small diameter. If the handgrasp is less than twelve inches in length, and the taper begins at 15-32 of an inch and is hollow for a short distance, then gradual to the top, with a diameter there of 7-64 inch, the 66-inch rod will be equally serviceable for fishing and for practice in tournament casting. It may well be termed an all-round rod.

In view of these facts, as well as for the sake of brevity and simplicity, I will try to instruct beginners in making bait rods 5½ feet in length. The application of the same principles to the making of rods of other lengths will follow naturally and fly-rods will be treated separately.

Several things must be considered by the beginner before he obtains his rod materials:

First. It is evident that the ideal rod is one made of a single length of wood or split bamboo, with a handgrasp permanently glued on its large end. But while this is particularly

true of split bamboo, it does not apply with equal force to wood, as it is more difficult to obtain a slender straight-grained piece of wood sixty-six inches in length and free from knots and other imperfections. Still, this is not impossible.

Second. A rod with only one joint. Such rods are frequently made with a long tip and a separate handgrasp. This is a most excellent type, and rods of this form are very popular. They are more compact than the one-piece rods, and almost if not quite equal to them.

Third. A rod consisting of a butt and a tip of the same length. This is not quite the equal of rods of the second class, but much more handy to make and to carry about. Theoretically the ferrule should not be placed in the middle of the rod; practically a very good rod can be so made. Its simplicity is marked. It is a very common type, particularly in salt water fishing. I have made several rods, each consisting of one length, and have invariably cut them in two later on, placing the ferrule in the middle, or in the thick part near the handgrasp. Very little difference in the action of these rods, before and after altering, was noticeable.

Fourth. A rod consisting of a butt, a joint,

and a tip, all of equal length. This is the most common type known to-day, the handiest for carrying, but with its faults. Its ferrules are, in theory, placed to better advantage than are those of the rod of the second class. Practice undoubtedly proves this theory correct. In a rod of 5½ feet, however, the ferrules materially stiffen it at these two points, and it must be very carefully proportioned.

CHAPTER VI

ONE-PIECE BAIT-CASTING RODS

ASSUMING that you have obtained all the materials needed, we will begin our actual rodmaking, taking the rods as they are given and commencing with one of the first class, as it is the easiest type to make. As your rod, when finished, is to be 5½ feet long, the agate top adding about ⅝ of an inch, the wood should be slightly more than 5½ feet long, to allow for cutting down finally to 65⅜ inches.

Assuming that your wood is ⅝-inch square and free from knots, plane it a trifle on all surfaces and from both ends, to determine which way the grain runs; and having decided which shall be the butt end, drill two holes through the wood very close to that end, as shown in Fig. 28, and drive a brad in the right-hand end of your workbench, so that you can hook the big end of the wood over the brad and plane away from it, which is much more satisfactory than butting the small end of the wood against a cleat at the far end of the bench.

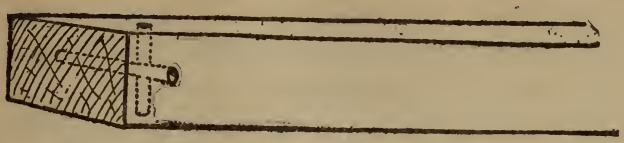


Fig. 28.—Arranging the Wood for Planing.

Plane the wood until it is straight and true, the gauge showing that it is ½ inch thick on each side throughout its length. If it is crooked, do not worry, and do not attempt to correct this by planing more off one side than the other. It can be straightened perfectly later on. Mark the exact center at each end with two lines crossing in the center.

If your handgrasp is to be single, mark a point ten inches from the butt end and continue the line entirely around the wood. This will allow you to saw off an inch where the holes are, and give you space for a nine-inch handgrasp. If the grasp is to be double, allow twelve inches, for an eleven-inch grasp.

Begin at your pencil mark and plane carefully and evenly to the tip end on all sides. Use the caliper frequently, noting the diameter every six inches. If there is a thick place, mark it heavily with the pencil and plane that part lightly, then continue to reduce all sides until you have a nice even taper and the small

end is 5-32 of an inch thick. Holding the tip end on the floor, exert a slight pressure and note the curve of the whole piece, which should arch nicely, the curve diminishing gradually toward the butt. Turn it, and see if the spring is fairly uniform on all sides.

Now caliper carefully and trim off uneven places until the diameter of both sides is exactly alike at each six-inch station. Use the small plane for this work, setting it very fine.

A piece of board with a groove in one edge, preferably four feet long, is now in order. Pine tongue-and-groove stuff, used for partitions, is ideal. Its value for other branches of rodmaking will be explained further on. Plane the edge, so that the groove will be shallow at the tip end, and fasten it in the vise or nail it lightly to the side of the bench. Lay the rod in the groove, with one of the four corners uppermost, and setting your small plane a trifle coarse, take off the corner evenly from butt to tip, ignoring your pencil mark.

Turn to the next corner and plane it, then the other two. Use the utmost care in transforming the strip from square to octagon form, and caliper frequently until it is of exactly the same diameter on every side at each six-inch station. You are now shaping the strip, so that

the next step will make it round, and in this stage haste will work sad havoc with later plans. The eye, the caliper and testing the arch must all be depended on at this stage. Every one of the eight sides must be uniform. A perfect strip is illustrated in Fig. 36, p. 103.

Setting your small plane very fine again, lay the strip in the groove and take off one of the corners the full length. Turn to the next one and remove it, and so on. The rod is now approximately round, cylindrical in its first foot, then tapering gradually to the small end.

There are various ways to make it perfectly round. One is to lay it flat on the bench, and holding it under the palm of the left hand, roll it backward and forward while sandpapering it with a sheet of that abrasive folded over a block of wood, held in the right hand and moved rapidly up and down the rod. I prefer the flat steel scraper, and turn the rod rapidly while working from end to end, using the grooved board to hold it steady.

Stop frequently and draw the rod through the fingers to locate uneven places. If none are found, go over the rod thoroughly with sandpaper folded and held in the hand without the block. You are now ready for final tapering.

At this stage I take a strip of paper the full length of the rod and draw two parallel lines on it, each 65⅜ inches in length. The upper line I mark "rough calibers," and the lower line "final calibers." Marks are placed on each line to indicate the place where the taper of the handgrasp is to be, then every six inches to the tip end. Lay the rod beside the upper line on your paper, caliper it at every station, and set these figures down on the corresponding mark. Note them carefully, for if the wood has been planed properly in the square, the tapers will be nearly uniform from handgrasp to tip-end, but the wood will not, in this form, be properly proportioned for use.

If you were working by rule-of-thumb, without a rod to copy, the only thing would be to put a top and guides on the rod temporarily, fasten a reel on the butt with cord, run the line through, attach a quarter- or half-ounce weight, and try a few casts; but the formula in Fig. 29 will save time. These calibers were taken from several bethabara rods that have seen long use in fishing and practice casting.

If the wood is dagama or greenheart, add 1-64 of an inch or a trifle less to each diameter given. Try the rod before deciding, for the action varies with different pieces of wood,

and none can be exactly alike. In Fig. 29 the lower line of figures mark the six-inch stations; the upper figures the final calibers of a bethabara rod. It will be noted that, commencing at the cylindrical butt end, the calibers de-

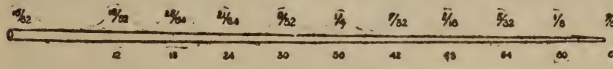


Fig. 29.—Calibers of a Bethabara Rod.

crease rapidly to the thirty-inch station, then are nearly uniform to a point close to the top.

Mark these calibers on the lower line of your paper, and note the variations between them and the calibers of your rod. Then scrape or sandpaper from your pencil mark toward the tip, gauging often until your rod is very nearly as small as it is to be finally. Now tie on a reel, guides, and top and try the rod in casting. If it pleases you, go over it lightly with fine sandpaper and fit the agate top permanently. Use a flat file in tapering the wood to fit the tube snugly. Heat your ferrule cement and coat the wood lightly with it, then heat the tube of the top, push it home, and turn it around until the inside is evenly coated with cement.

Measure from agate top to butt and saw the

latter at the 66-inch mark. Warm the agate top over the flame of a match and remove it for the present.

Select a number of corks and warm your glue. A piece of thin 15-32 inch tubing is now needed. An old ferrule will answer. File the outside of one end until the edge is sharp. Holding the tube in the center of a cork, with a pad in the palm of the hand to prevent that end from cutting you, turn the tube evenly until it cuts through the cork like a wad-cutter. The result will surprise you—a nice smooth hole through this seemingly difficult substance to work. Do not, however, try to hammer the tube through the cork.

Drop this cork circlet over the tip of your rod and push it slowly down to the butt, the last inch of which has previously been coated with hot glue. Punch out another cork, slide it down, coat the first one with glue, press them into close contact. Proceed in this manner until you have ten corks on the rod, giving you a handgrasp approximately five inches long.

Now procure a piece of white pine 5 inches long and ¾ inch in diameter. Bore a 15-32-hole through it and round off the outside until it will go inside the reelseat easily. This should be perfectly made, and it may be best to have it turned in a lathe. Taper one end until it

will fit the taper of the reelseat nicely, while the other end should lack a quarter-inch of being as long as the reelseat. Slide this pine sleeve down over the rod (see Fig. 30), coat

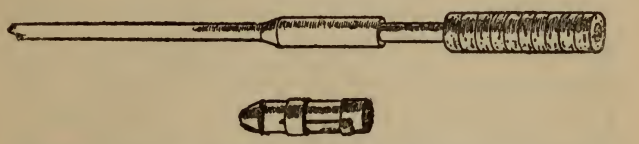


Fig. 30.—Corks in Place and Sleeve Ready to Be Glued On.

the rod and the uppermost cork with glue, press the pine sleeve home and put the rod aside for a couple of days until the glue dries.

If you want the handgrasp to be shaped in a certain way and be nicely finished, have it turned in a lathe. I prefer to have mine perfectly cylindrical throughout, and press the reelseat into the top cork, leaving a right-angled shoulder to serve in lieu of a finger hook. I take a piece of sandpaper, folded round a block of wood, and turning the rod rapidly, work back and forth lengthwise of the grasp, gauging frequently, then using fine sandpaper until the grasp is cut down to 1 1-16 inch in diameter.

Taper the lower corks until the buttcap will fit snugly. Warm the buttcap, rub a little ce-

ment inside, push it home, and when it is cold drill a hole in it and into the butt of the rod, drive a brass pin home and file it off flush with the surface of the cap. Wipe off surplus cement.

In fitting the reelseat over the pine sleeve, place the hooded end down, so that in fitting the reel to the seat the band will pull down and in this way bring the reel near the hand, so that the index finger will grip the cork shoulder and render your control of the reel and rod firm. If the yoke of the reel fits the seat as it should, and the band is tight, the reel will never work loose, even in a long fight with a big fish.

The three-quarter-inch commercial reelseat is about 4½ inches long, and for bait-rods the correct way—in theory, at least—is to fit it with the sliding band at the bottom, so that the band will push forward over the reel-yoke and counteract the tendency of the reel to work loose in playing a fish. Fitted with the hood on the upper end of the reelseat, the reel goes so far forward that more than an inch of the seat is exposed, and the right hand must grip this metal instead of the firmer and less slippery cork or cord wound grasp; hence, the shape of a well-formed grasp counts for less than it should.

If the handgrasp is single, the length of the reelseat does not so much matter, but when the grasp is double I prefer to cut the reelseat down to a length of 3¾ inches, and also file the after end of the reel-yoke until its length is only 2½ inches. This brings the reel nearer the hand, and also places the upper grasp where the left hand can rest on it in spooling the line.

Formerly I made all my bait-casting rods with double handgrasps, but have finally arrived at the conclusion that for tournament casting the upper grasp is a useless thing that serves only to stiffen the rod at that point. I always grasp the reel in spooling line and in playing a fish, holding the reel with three fingers of the left hand, while the index finger and the thumb spool the line. Making the grasp single and short adds to the resilience of the rod and makes it neater, and easier to build. I always place the hooded end of the seat down, and if the band is wedged tightly over the yoke, as it should be, there is no play. A great many sea and other rods are made with the hooded end down.

See that the yoke of your reel is standard. Formerly every manufacturer made yokes as best suited his fancy, but some twenty years

ago the National Rod and Reel Association adopted three standards for reel-yokes. The smallest, ¾-inch, was cut on the arc of a ten-cent piece; for ⅞-inch reelseats, a nickel; and for 1-inch reelseats, a silver quarter. Nearly all manufacturers follow these gauges.

Assemble all the parts of the reelseat and push it down over the pine sleeve, working it well into the topmost cork, to form a waterproof joint. If the taper fits the tapered end of the pine sleeve, remove the seat, coat the sleeve with cement or glue and push the reelseat home. A brass pin through the hooded end and reelseat will fix the metal parts of your handgrasp rigidly. This pin should merely enter the wood of the rod, but not penetrate far, or it may weaken it. I prefer to set two very small brass camera screws, one on each side of the hood, and two of these instead of one pin in the buttcap. They are not so likely to work loose as is the case with pins. They should be ⅜ inch long.

Now go over the rod with the finest sandpaper, wet the wood to raise the grain, let it dry, then cut it down with a bit of well-worn fine sandpaper, polish diligently with shavings from the rod, and finally rub with tissue paper until you secure a high gloss. Replace the

agate top, rub the rod with coach varnish on a rag, and suspend it on a brad in an airy or sunny place free from dust until it is dry. If it is crooked, let it hang with a heavy reel in place.

Tie the guides on with cord, attach a reel, and practice with the rod until you are satisfied—either that it suits you or that it needs reducing a trifle in places where it seems too stiff.

Just here it is well to quote the late Major Traherne, who, in "The Badminton Library on Salmon and Trout," said of the greenheart salmon rod:

"I am at a loss how to describe it, but its virtue lies in an equal distribution of strength, in proportion, from the butt to the point. A heavy butt, with no spring to it, and with a weak top, is of little use for casting purposes beyond a certain distance. The spring should be felt, to a certain extent, to the bottom of the butt when casting; and I consider a rod which does not possess this quality of little or no value."

This applies to all rods, whether for lure or fly-casting; but in finishing the bait-rod it is well to remember that for quick, snappy casting the taper from the middle to the tip-end

should be more rapid than in a rod intended for slow, even casting with light lures, and for accuracy casting. In this the taper may be rapid for a short distance, then slow to the tip, giving greater resilience to the whole rod, but retaining strength near the handgrasp.

Several trials should satisfy you with the rod. If it is reduced in places, finish as before, with the final coat of varnish rubbed in. This thin coat serves as a protection under the silk windings, which, as will be explained in the proper place, are put on without wax. You are now ready to wind and varnish the rod.

If you decide to wind the grasp with cord, procure one of the pine single grasps which cost about twenty cents, and trim it to fit the reelseat snugly, tapering at the forward end to fit the metal taper. Slide it down over the rod and glue it in place. When dry form a shoulder at the bottom so the cord will end there, as shown in Fig. 31, and wind with cord. The cord should be covered for a quarter-inch at the butt by the cap, and for an equal distance at the other end by the reelseat. The latter is put on in the same fashion as with a cork grasp.

If you wish to make a double cork grasp, the reelseat and taper shown in Fig. 18 are

necessary. In this case the corks for the lower grasp are followed with a pine sleeve a quarter-inch shorter at each end than the reelseat. This is cemented on and another cork pressed down until it butts against the sleeve and is pierced slightly by the upper end of the reelseat. More corks are glued on until the desired length of the small upper grasp is attained, then the glue given time to dry. The cork is then worked down, tapering forward until the small metal taper finishes it off. This is cemented lightly in place.

A double grasp, cord wound, requires more care. It is first necessary to obtain a pine grasp, bored through. These come in the shape shown in Fig. 32, and much longer than necessary. Saw in the middle, fit, and wind the lower grasp, try the reelseat and cut off the cylindrical part of the grasp so that the joint will come under the reel, rather below the center. Attach the reelseat permanently and fit the upper grasp, making it fit snugly, but allowing for the thickness of the cord to be wound over it. Now wind a dozen turns of cord over the upper grasp (see Fig. 33) and try it, removing the cord and taking off a little wood until it will butt against the other end under the reelseat. Replace the cord,



Fig. 31.—Cord-wound Pine Handgrasp.

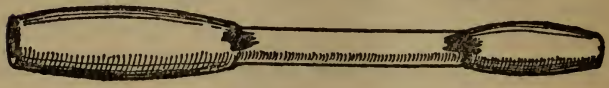


Fig. 32.—Pine Handgrasp, Double.



Fig. 33.—Upper Grasp Ready for Gluing in Place.

coat the rod and inside of sleeve with glue and push it home. Continue the winding until the upper grasp is covered, then tie off and fit the taper (Fig. 18) snugly in place.

These cord-wound grasps should be given two coats of shellac and one of coach varnish as soon as they are dry. It must be remembered that small cord, when varnished, is somewhat slippery when wet, and large cord is harsh to the hand. If the size is equal to that of D or E silk lines it will make a good grasp.

I prefer the cork grasps for many reasons, among them being the ease with which they can be made after one has had a little practice. Cork must be humored, as it were. If you find that sandpapering the grasp lengthwise does not result in a velvety finish, secure the rod in

a vise after wrapping it with several thicknesses of cloth, and with a long strip of the finest sandpaper, go over the grasp just as a boot-black does with his polishing cloth, turning the rod occasionally. You will soon learn to impart a nice finish, and this will prove that you can, on a pinch, get along without the use of a lathe.

CHAPTER VII

ONE-PIECE BAIT-CASTING RODS WITH SEPARATE HANDGRASPS

TO make a rod of the second class, in which the handgrasp is to be single and nine inches in length, the wood for the tip, inclusive of the agate top, will be approximately 58½ inches long, as the ferrule center on the large end of the tip will enter the handgrasp ferrule about 1½ inches. These ferrules should be 15-32 of an inch in diameter and of the type shown in Fig. 17. The large end of tip is marked for a distance equal to the small end of the center, and the wood carefully reduced with a file until it will enter the center snugly to its very end, as illustrated in Fig. 34. The center is then cemented on, and the tip is ready for its rubbed coat of varnish and the winding. Obviously this tip is to be made of the same diameter as rods of the first class—described in a preceding chapter—save that it begins to taper at the ferrule.

Rods of this class are not always made with

two tips, but this can be done by purchasing two centers to fit the ferrule in the handgrasp. By making one tip as described above, and the

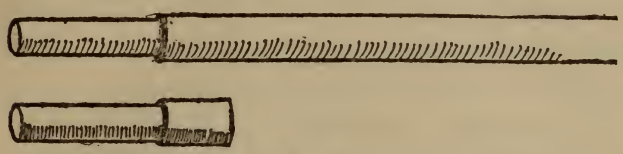


Fig. 34.—Large End of Tip, Shouldered to Fit a Capped Ferrule Center.

other one with a rapid or hollow taper for six inches above the ferrule, then gradual to the small end, practically two rods will be the result. One tip can be stiff, for distance casting, and the other one more willowy, for accuracy or light lure casting—a very useful combination. I have made a tip of this sort from bethabara which will cast a quarter-ounce lure nicely, and is so well proportioned that it is a pleasant rod to fish with. The dimensions follow, and may be compared for reference with those given in Fig. 29. The center is 15-32 of an inch, and the wood tapers quickly at first, to 23-64 at the six-inch mark; at 12 inches, 21-64; 18 inches, 19-64; two feet, 17-64; 2½ feet, 15-64; three feet, 13-64; 3½ feet, 11-64; four feet, 5-32; 4½ feet, ⅛; 58½ inches, at the top, 7-64 of an inch.

A separate single handgrasp can be made as follows: Fit the ferrule (Fig. 17) on a piece of light but springy wood like spruce, dagama, or greenheart. This must be rounded nicely and the ferrule seated on it just so that the

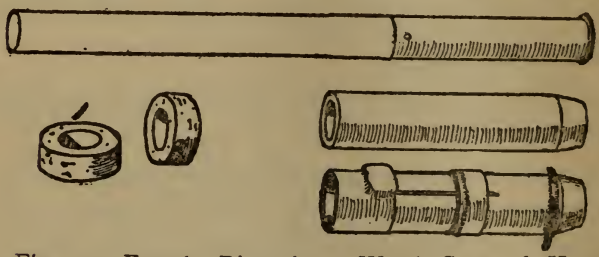


Fig. 35.—Ferrule Riveted on Wood Core of Handgrasp, Pine Sleeve Ready to Be Glued On, and Reelseat and Corks for Grasp.

center will not touch the wood. Cement and rivet the ferrule on to the core, fit a pine sleeve over the wood and the ferrule, with forward end of sleeve tapered to fit a reel-seat like that shown in Fig. 16. Now try the reel-seat, and when it fits snugly, with its lower end extending a quarter-inch below the pine sleeve, glue the sleeve on the wood and the reel-seat on it, and rivet or screw the reel-seat in place.

Slide a perforated cork forward over the wood and work the end of the reel-seat into it until it butts against the end of the sleeve.

Glue this cork in place, following with others until the total length of grasp, inclusive of reel-seat, is nine inches, when the wood core is cut off and the cork finished and fitted with a butt-cap. A handgrasp of this form will never come apart if properly made. Its parts are anchored at both ends.

If to be cord-wound, the pine grasp is fitted over the wood core and ferrule, the taper placed over the ferrule and the grasp fitted to it, as in Fig. 35. Beginning at a point that will be covered by the after end of the reel-seat, the grasp is wound a few turns with cord and the reel-seat fitted over it. The core is then coated with glue and the grasp pushed forward until the reel-seat and the tapered end of the grasp fit closely, when the winding is resumed and tied off at the shouldered butt end. The butt cap and reel-seat being riveted in place, this separate grasp is ready for shellac and varnish.

If to be double, and cord-wound, the forward grasp is first fitted over the wood core, the taper (Fig. 18) pushed up against the welt on the ferrule, and a few turns of cord wound on the tapered end of the upper grasp, then this grasp glued in place on the wooden core, with the winding covered by the taper. Con-

tinue to wind down to the cylindrical part, fit the reel-seat and glue it on, wind a few turns over the lower grasp, try it, and finally glue it in place; then wind to the shouldered butt end and fit the butt cap. The two parts of the pine grasp abut inside the reel-seat, as illustrated in Fig. 33.

CHAPTER VIII

TWO-PIECE BAIT-CASTING RODS

FOR a rod consisting of two pieces of equal length, it is well to begin with a butt three feet long and 5/8-inch square, and two tips, each three feet by 3/8-inch. If the taper is to be the same as in the rod of the first class, the only extras will be a 17-64-inch ferrule with two closed-end centers, one for each tip. The tips will taper from 17-64 to 7-64 inch.

Naturally the beginner would make the butt first, whereas I advise him to make the tips first, for this reason: The offset and tube tops are not all of the same length, and if it is desired to make all pieces exactly the same length, the tips should be finished first. This applies especially to three-piece rods, in making which it is difficult for the beginner to figure correctly on the separate parts; for the length of the tip is added to when the top is put on, and each of the ferrules adds something, so that it is hard to get all pieces of the

same length without wasting time trying and cutting until all are correct.

I give exact lengths for each piece, but if it is desired to make the rod longer or shorter than five and one-half feet, it must be remembered that the trimmed tip shown in Fig. 38 is slightly more than one-half the total length of the rod, for the reason that the ferrule on the butt adds 1¼ inches to the actual length of the wood; hence the wood in the butt must be slightly shorter than the wood in the tips, in order that all parts will be the same length when completed.

Extreme care must be exercised in fitting the centers on the tips, as the least uneven place will force the center out of true alignment, and this applies to the ferrule, too. It is also easy to break a tip in sandpapering. When the tips are finished (see Fig. 37) they will be 33 inches in length and 33¾ when fitted with centers and tops, as shown in Fig. 38. When polished for the last time, they should be rubbed with varnish and suspended.

One of the common bevel-gear drill stocks, with a chuck large enough to take a ¼-inch drill, can be made to serve you in a way its manufacturers probably never thought of. This tool is made with a revolving wheel and

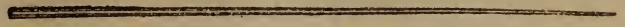


Fig. 36.—Tip Planed to Octagon Section.

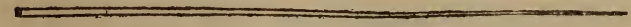


Fig. 37.—Tip Ready for Mounting

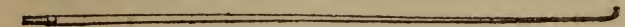


Fig. 38.—Tip Fitted with Center and Top

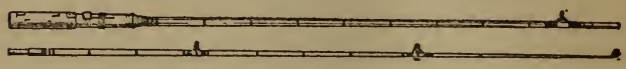


Fig. 39.—Butt Joint Finished and Ready for Handgrasp and Ferrule.

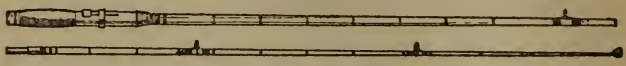
handle on one side, for the right hand, and a stationary knob on the other, for steadying with the left hand. Remove this knob and fasten its spindle in the vise, wheel and handle on top. The chuck will take one of your tips, but do not close it too tightly. Turn the wheel with your left hand and polish your tips with a bit of sandpaper held in the right hand, moving forward and back very rapidly, to prevent circular scratches. If the tip is springy, be very careful as you approach its small end, for with this makeshift lathe you may snap off the end if you happen to let the sandpaper slip and catch it.

By fitting a wood plug into the ferrule and securing the other end of the plug in the chuck, you can polish the butt or joint of your rod,

but it is advisable to have someone else turn the wheel while you support the rod with one hand and polish with the other. This of course applies to tips, too.



Split Bamboo Tournament Rod with Cylindrical Cork Handgrasp.



Bethabara Casting Rod.



Jucara Prieto Casting Rod with Double Cord-wound Handgrasp.

Figure 40.

The butt of your rod will be 32½ inches long when ready for ferrule and handgrasps (see Fig. 39). It will taper from 15-32 at the forward end of grasp to 19-64 at the ferrule, it being remembered that the cap or shoulder on this ferrule is 1-32 of an inch larger than the cap on its center.

At first the tip may seem too heavy, but it must be remembered that it should be heavier in a wood rod than in one of split bamboo, and that whereas many split bamboo tournament rods are made with very little resiliency

in the butt, the wood rod, when the tip is placed on the floor and pressure applied, should show a nice arch for more than half its length from the tip, while there should be quite a bit of spring below the ferrule. There is no fixed rule for determining how much to take off the butt. Testing it repeatedly will be the best plan, but if it still seems too stiff, the diameter of the butt must be reduced with the greatest care, else you may go too far. Placing the ferrule in the center of the rod requires more care in trying it out than if there are two ferrules—as in a three-piece rod—but practice with reel and weight will satisfy you.

When the taper of the butt joint suits you, the grasp is put on as described in Chapter VI., the wood is finished as described for the tips, rubbed with varnish, and it is then ready for winding. It is made without pins through ferrule and centers, as will be noted. Pins keep the ferrules in place, but unless put in by an expert they may weaken the wood where it needs strength, and good cement may be depended on. At most a ferrule may work loose, but it is merely necessary to warm it temporarily to secure it until it can be removed and put back with new winding or a little more cement.

All of the best rods are equipped with pinned ferrules, and they seldom work loose. But these are fitted by expert workmen, aided by the finest machine tools. As I am writing from the beginner's point of view, I advise cement only. Should a joint be broken while you are far from home, there is no troublesome pin to pick out. Instead, you warm the ferrule, push out the broken wood, and set the ferrule on a freshly fitted part.

CHAPTER IX

THREE-PIECE RODS

THE most common type known is the three-piece rod, the separate parts of which are of equal length. The angler who must go far afield for his fishing demands a rod that is compact, just as he wants a take-down gun in the autumn. The difficulty experienced in traveling in trains and street cars, as well as in walking through crowded streets, argues against unwieldy parcels, and the fly or bait rod must be made in lengths convenient to carry. The rodmaker might argue until doomsday in favor of long-joint rods, claiming better action, greater strength, etc., but he could never persuade his patrons that these qualities outweigh the greater handiness of short joints.

This being true, the rodmakers place the joints where they will affect the action of the rods the least; namely, in two places, making even an 11-foot fly-rod conveniently portable when taken down. They carry this practice to

the longest salmon rods, which are nearly always made in three joints, proving that no maker likes to place ferrules in the middle of the rod—which is necessary in making a four-joint rod. The principal exceptions are the short two-piece salt-water rods, which are more or less stiff throughout their length; and the short bait-casting rods.

In a 5½-foot bait-casting rod of the necessary caliber, two ferrules make the joints very short, and the stiff metal is actually about one-eighth the total length of the rod. Aside from the fact that the ferrules in short three-piece rods are placed to better advantage, the rod made in two pieces of equal lengths is to be recommended. Certainly it is almost as easy to make two of this type as one with three joints and an extra tip. When the three-joint rod is to be made 6 or 6½ feet long, however, its advantages increase with its length.

In a 5½-foot rod made in three pieces of equal length, and of the caliber given in Fig. 29, the ferrules will be 21-64 inch, with one center; and 13-64 inch, with two centers, for the tips. The tips when completed and fitted with tops, will be 22¾ inches long and will be tapered from 13-64 to 7-64. Finish these first.

It is well to bear in mind that you cannot make each of the other two joints one-third of the total length of the finished rod, for the reason that the tip is to be pushed one inch into the ferrule of the middle joint, and this in turn 1⅛ inches into the ferrule on the butt joint, while these two ferrules add to the actual length of the two lower parts.

A more difficult problem in division and addition it would be hard to find. The first time I tried to make a rod of three pieces of equal length I almost gave it up in despair, for despite what I thought was exact calculation, the separate parts would vary or the total would be too great. Finally I drew a pencil mark on the floor just 5½ feet long, and sitting down, puzzled the problem out by placing the three parts of the rod, with the ferrules beside them, on the line, and measuring until the adjustments were correct.

The actual length of the middle joint will be 21¾ inches, for the top or female ferrule will extend 1 inch beyond the wood, making this joint 22¾ inches when it is finished. Taper the wood from 21-64 to 15-64, it being remembered that the cap of the ferrule is slightly larger inside than the caps of its centers. Cement the ferrule on the small end of

the middle joint and the center of the butt ferrule on the other end.

The wood of the butt joint will be 21½ inches long, as the ferrule adds 1¼ inches to its total length, 22¾ inches. Taper it from 15-32 at the pencil mark, indicating the upper end of the handgrasp, to 11-32, to fit the cap of the ferrule, which is 21-64 at the small end.

You are now ready for the handgrasp, the various forms of which are described in preceding chapters. Careful testing is necessary before this rod can be finished, for different pieces of wood vary considerably, and it is seldom one can make all the tapers just what he expects to. The two lower joints may need fining down until the action suits you, and in some rods I have substituted 19-64 for the 21-64-inch lower ferrule, making a hollow taper from handgrasp forward a few inches, then uniform taper to the first ferrule.

If the rod is to be six feet long, which will make it much sweeter for fishing and accuracy casting—its three joints considered—the ferrules should be 15-64 and 21-64. One of my favorite bethabara rods is 5 feet 10⅜ inches long and it is a very pleasant rod to fish with. Its ferrules and calibers are the same as those given above.

CHAPTER X

SALT-WATER RODS

THE best type of rod for salt-water fishing is the long tip and separate handgrasp. This applies to all rods used in sea fishing, whether for tarpon, tuna, striped bass, weakfish, or small fry, the length and weight depending on the kind of fish angled for. By using the separate handgrasp, the joint can be made very strong, and tips of different caliber or length are available, one handgrasp serving for a part of two or more rods.

Two-piece rods, with the parts equal in length, come next. Other styles are used occasionally.

Bethabara is the favorite wood and split bamboo is coming into more general use for weakfish rods and even for larger fish, including tuna and tarpon.

It has long been the practice to equip heavy salt-water rods with two sets of guides, so that any inclination of the tip toward set can be

corrected by turning it half-way round and using the other guides, etc. There are objections to this, due to the possibility of the line catching on the lower guides, and among anglers for big sea fish there are many who favor one set of guides only. The strain of trolling, and of fighting and landing heavy fish on a long line will permanently set any tip, but this can be corrected now and then so that the fault is not important.

I will give the specifications of three salt-water rods I have made at various times, the material of all being bethabara, and each being a useful type. They are illustrated in Fig. 41.

Tarpon Rod.—Length, 6 feet 10¼ inches; tip, 5 feet 5¼ inches. Handgrasp, 21 inches, wound with celluloid and fitted with a rubber button. Swell of handgrasp, 1 11-32 inches. Reel-seat, 1 1-16 inches in diameter. Taper of tip, 29-32 to 5-16 inch, uniform throughout. Caliber of agate stirrup-tube top, ⅜ inch. First set of trumpet guides, 9 inches from top; second set, spaced 14 inches; third set, spaced 17 inches; set of agate hand guides, 25 inches from reel. The weight is about 24 ounces.

Surf-Casting Rod.—Length, 6 feet 11½ inches; tip, 4 feet 11¾ inches. Handgrasp, 25¼ inches long, or 22½ inches to center of

reel. Swell of grasp, 1 3-16 inches. Material, a greenheart 17-32-inch core, covered with solid cork, making a very light as well as springy butt whose core is of the same diameter as the tip, of which it is really a continuation. Reel-seat, ⅞ inch, fitted for a 250-yard reel. Tip calibers: ferrule center, 17-32 inch; 6 inches forward, 17-32; 12 inches, ½; 18 inches, 15-32; 24 inches, 7-16; 30 inches, 13-32; 36 inches, ⅜; 42 inches, 21-64; 48 inches, 9-32; 54 inches, 17-64; at top, ¼ inch. Top, stirrup-tube, 5-16 caliber; raised agate guide, 10½ inches from top, with the second guide 14 inches below the first and 36 inches from the reel. Guide calibers, 5-16 and ⅜ inch.

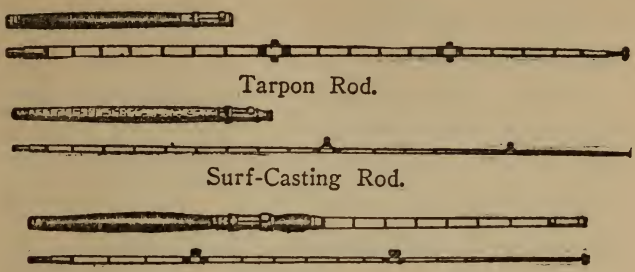
This rod weighs only 13 ounces. It was designed for the regulation 2½-ounce lead weight in long distance tournament casting, but will also handle a 3- or 4-ounce sinker nicely, this weight being necessary in casting in the surf, where the combers will pick up a lighter weight and carry it into shoal water. It also has tremendous power for its weight, and is resilient throughout its entire length, in which it differs from rods having heavy, stiff handgrasps; is a pleasant rod to fish with, and one can cast a 2½-ounce weight 175 to 200 feet

with very little effort. The grasp is made in the manner illustrated in Fig. 35, but the core is largest under the reel, then tapers to about ⅜ inch at the butt, making it in fact a double-tapered rod.

The grasp is so light that tips of small caliber and length are available, but for all-round sea fishing the handgrasp should be made about six inches shorter.

Light Salt-Water Rod.—Length, 6 feet ⅝ inch; joints, 36⅞ inches. Weight, 13 ounces. Handgrasp, double, cord-wound; length, 21 inches. Swell of lower grasp, 1⅛ inches; of upper grasp, 1 inch. Diameter of reel-seat, ⅞ inch. Taper, handgrasp to ferrule, uniform, 35-64 to 29-64; ferrule center, 7-16 inch. Caliber of tip 6 inches from center, 13-32; 12 inches, 25-64; 18 inches, 11-32; 24 inches, 21-64; 30 inches, 9-32; at top, 15-64 inch. Top, stirrup-tube, agate, 5-16; bell guide, 9½ inches from top; second guide, 5-16, agate, spaced 17½ inches, and 27 inches from reel.

This rod is pleasant to use for medium-sized sea fish, and handles the standard 2½-ounce weight nicely. In one of the tournaments of the Anglers' Club of New York in Central Park five contestants used this rod, the best cast with it being 190 feet.



Tarpon Rod.

Surf-Casting Rod.

Light Salt-Water Rod.
Figure 41.

The details of construction for similar light weight wood rods, already given, will apply to these salt-water rods, save that heavier material will be needed. For my tarpon rod I obtained bethabara 1 inch square; for the surf rod, ¾ inch; for butt of two-piece rod, ¾ inch, and for tip, ½ inch.

In making handgrasps for rods of this class I leave the wood core somewhat rough, in order that the glue will have better holding ground than if the core were polished smooth.

Merely to give an idea of the expense, in time and cash, to the amateur rodmaker, I give below the following data relating to these three rods. All are bethabara.

Tarpon Rod.—Cost of material, about $7.50; time required, ten hours.

Surf Rod.—Cost of material, about $6; time required, about seven hours.

Light Salt-Water Rod.—Material, $4; time, nine hours.

If the surf rod is made of dagama, purchased in billet form, the cost can be reduced somewhat. The time given above refers only to finishing and mounting the rod, and does not include winding and varnishing.

CHAPTER XI

BASS AND TROUT FLY-RODS

IF the beginner is determined to make an all-wood fly-rod before attempting to build one of split bamboo, the directions previously given for three-joint bait-rods will apply here, with the exception that the joints must be made somewhat longer, the taper slower, and the reel-seat is placed below the hand. Straight-grained bethabara makes a nice fly-rod of medium weight, and dagama works well.

It is scarcely advisable for the novice to begin his rodmaking on a split bamboo trout fly-rod of light weight, for the tips run so small that one can hardly expect to do creditable work on them at first. But bass fly-rods of 6½ or 7 ounces are easier to build, and after you have had some experience with butts and joints, tip making will not present insurmountable difficulties.

Below are given the calibers of three typical fly-rods that are excellent for fishing. They

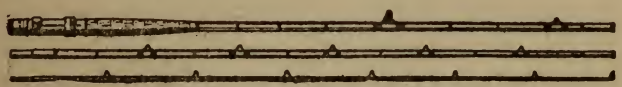
have seen hard service. All are hexagonal bamboo. The handgrasps are solid cork, the hand guides agate, the other guides of steel, snake-pattern, and the tops loose steel rings:

Heavy Fly-Rod.—Length, 9 feet 8 inches; weight, 7 ounces. Joints, 39½ inches long. Grasp, 9½ inches long, inclusive of ¾-inch reel-seat. Ferrules, serrated, waterproof, 21-64 and 13-64. Calibers: at taper, ½ inch; 12 inches from butt, 7-16; 18 inches, 13-32; 2 feet, 25-64; 2½ feet, ⅜; 3 feet, 23-64; 3½, 11-32; 4 feet, 5-16; 4½ feet, 19-64; 5 feet, 9-32; 5½ feet, 17-64; 6 feet, ¼; 6½ feet, 15-64; 7 feet, 3-16; 7½ feet, 11-64; 8 feet, 9-64; 8½ feet, ⅛; 9 feet, 7-64; at top, 5-64 inch.

Medium Weight Fly-Rod.—Length, 9½ feet; joints, 38½ inches. Weight, 6 to 6½ ounces. Grasp, 9½ inches; reel-seat, ¾ inch. Ferrules, serrated, waterproof, 19-64 and 3-16. Calibers: butt joint, at taper, 13-32; 1 foot from butt, 25-64; 1½ feet, 23-64; 2 feet, 11-32; 2½ feet, 21-64; 3 feet, 19-64. Middle joint, 6 inches, 19-64; 1 foot, 9-32; 1½ feet, 17-64; 2 feet, 15-64; 2½ feet, 7-32; 3 feet, 13-64. Tips, 6 inches, 11-64; 1 foot, 5-32; 1½ feet, 9-64; 2 feet, ⅛; 2½ feet, 7-64;

Trout Fly-Rod.—Length, 9 feet; joints,

36½ inches. Weight, 5½ ounces with ¾-inch metal reel-seat; with reel bands instead, a little less than 5 ounces. Grasp, 9 inches long. Ferrules, serrated, waterproof, 9-32 and 11-64 inch. Calibers: butt joint, at taper, 7-16; 1 foot from butt, 25-64; 1½ feet, 11-32; 2 feet, 21-64; 2½ feet, 5-16; 3 feet, 19-64. Middle joint, 6 inches, 9-32; 1 foot, 17-64; 1½ feet, 15-64; 2 feet, 7-32; 2½ feet, 13-64; 3 feet, 3-16. Tips, 6 inches, 11-64; 1 foot, 5-32; 1½ feet, ⅛; 2 feet, 7-64; 2½ feet, 3-32; 3 feet, 5-64 inch.



Split-Bamboo Bass Fly-Rod.



Split-Bamboo Trout Fly-Rod.
Figure 42.

Ordinary sumach, obtainable in any thicket, is nicely adapted to use for light handgrasps where reel bands are to be used. It is greenish-yellow when varnished, but can be stained nicely to resemble cedar or cherry, then varnished.

Tournament fly-rods are allowed ¾ of an ounce for metal reel-seats; therefore a rod just

under 4¾ ounces will be admitted to the four-ounce class, and one just under 5¾ ounces to the five-ounce class, if each has a metal reel-seat. The length limit is 11½ feet.

Five-ounce tournament rods are usually 10 feet long and much stiffer than rods made exclusively for fishing, but they are pleasant to fish with, particularly on windy days, with a heavy double tapered line.

Heavy single-hand tournament rods that are admitted to the open-to-all trout fly contests are limited only in length, to 11½ feet, but may be any weight. In the East these seldom weigh more than 10½ ounces and are generally 11 feet long, but in the West 11 feet 5 inches is a favorite length, and some rods weigh as much as 13 ounces. These are extremely stiff, and they are powerful enough to lift 100 or more feet of heavy tapered line out of the water.

The grasps are 12 to 15 inches long, and the rods taper from about ½ inch at the grasp to 7-64 at the top, with long and heavy split or serrated ferrules. These vary in caliber, but are about ⅜ and ¼ inch in diameter. The middle joint is heavy and tapers very little at the lower end.

CHAPTER XII

SALMON FLY-RODS

SINCE the earliest days of fly-fishing salmon fly-rods have been made of solid wood, and to-day, although split bamboo is largely used for all other fly-rods, there is a steady demand for solid wood salmon fly-rods. In Great Britain greenheart salmon rods are still the favorites with a vast number of the anglers, and it is likely wood rods will never be entirely replaced by those of split bamboo for salmon fishing.

In America the demand for salmon rods is small, for comparatively few of our anglers go to the Northern and Northeastern waters for these noble fish, and while those who prefer split bamboo rods for trout and bass fishing often wish to use rods of the same material when they fish for salmon, a great many favor wood rods.

For tournament casting I prefer split bamboo to wood in all rods, but split bamboo salmon rods are very expensive and a well-made

wood rod will give its owner a great deal of satisfaction. Furthermore, it is not so difficult to make as some of the thinner fly-rods.

In a rod whose length ranges from thirteen to eighteen feet and with a weight of 23 to 32 ounces or more, stiffness in the rod requires muscle in the angler. To wield a stiff bamboo rod of 25 ounces and a long and heavy line during several hours' fishing taxes the angler's strength more than does a whippy rod of greater weight, and this is one reason why wood rods are peculiarly adapted to salmon fishing. A nicely proportioned wood rod has good action and with it a fly can be cast and fished with less exertion at ordinary salmon fly-casting distances than is possible with the stiffer bamboo rod, hence anglers of small stature and average strength are likely to favor wood rods.

Again, the split bamboo rod does not begin to work until a certain length of line is extended; that is, it requires the pull of a long line to make the rod spring properly. Without this spring the fly cannot be cast neatly at any distance. Have you ever tried to cast a fly with a stiff bait rod? You have sufficient power in the rod, but lack the weight of line that is necessary to get the snap that sends the line in a rolling loop through the air. Try as

hard as you like, you will never be able to cast a fly ten yards. The wood salmon rod is proportionately as flexible as the whippiest trout rod, therefore but little muscle and weight of line are necessary to develop its spring, and its user can cast lightly and sweetly at fifty or one hundred feet—for the rod does most of the work.

In salmon fishing rods, great power is not of vital importance, for any one of these rods is capable of handling 100 to 125 feet of double tapered line, and that means that they can be depended on to kill the biggest salmon. It is essential to kill these royal fish on the rod and to gaff them only after their fight is ended; therefore, a nicely balanced wood rod will answer, it being conceded that bamboo will be less likely to give way to the accidents that may occur on any game fish stream.

Salmon fly-casting has grown more and more popular among the clubs that practice fly-casting as a pastime, and men who have never seen a salmon river and probably never will see one have become adepts with the salmon rod and its heavy line and leader. It appeals to many who do not care for the contests with four and five-ounce trout fly-rods, and it is an exceedingly fascinating game.

For a long time the maximum limit to the

length of tournament salmon rods was placed at eighteen feet, but in 1907 this was changed by the National Association and the limit placed at fifteen feet. This is in line with the desire to use lighter tackle, and it also enables salmon fishermen to use their thirteen, fourteen, and fifteen-foot fishing rods in tournaments, placing them on fairly even terms with contestants whose rods are made for distance casting only, but which would be rather stiff for all-day angling.

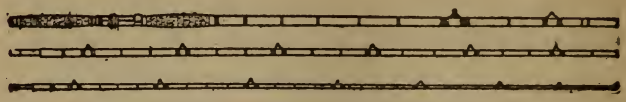
Of all the fly-rods, the salmon rod is the easiest one for the novice to build from solid wood, and there is no reason why he should not get excellent results from such a rod constructed for use exclusively in what is termed tournament casting; in other words, all casting for practice or for record.

I give the specifications of three salmon rods that I have used with satisfaction in tournament casting, and these are illustrated in Figure 43.

Split Bamboo Salmon Rod.—Length, 14 feet 11½ inches; joints, 5 feet 1 inch; weight, 26 ounces; material, six-strip Calcutta bamboo. Handgrasp, double, 24 inches long, solid cork fitted to bamboo direct. Length of lower grasp, 7 inches; diameter, 1 3-16; buttcap,

1 1-16; reel-seat, 6 inches long, 1 inch in diameter; upper grasp, 11 inches long, diameter 1 3-16. Calibers: 24 inches from butt, at taper, 41-64; 30 inches, ⅝; 3 feet, 39-64; 3½ feet, 19-32; 4 feet, 37-64; 4½ feet, 35-64. Ferrule, capped, welted, and serrated, 4½ inches long. Middle joint: Ferrule, 3⅝ inches long, 17-32; 6 inches from bottom, 17-32; 12 inches, ½; 18 inches, ½; 2 feet, 31-64; 2½ feet, 15-32; 3 feet, 7-16; 3½ feet, 13-32; 4 feet, ⅜; 4½ feet, 11-32; ferrule, capped, welted, and serrated, 3⅜ inches long. Tips: Ferrule, 2⅝ inches long, 21-64; 6 inches, 5-16; 12 inches, 19-64; 18 inches, 9-32; 2 feet, 17-64; 2½ feet, 15-64; 3 feet, 13-64; 3½ feet, 3-16; 4 feet, 11-64; 4½ feet, 9-64; at top, ⅛ inch. Tops, loose ring, steel. Guides: First, agate, 5-16; balance hard steel snake guides, fifteen in all.

Bethabara Salmon Rod.—Length, 14 feet 11 inches; joints, 5 feet; weight, 28 ounces. Handgrasp, double, 24 inches long, other dimensions same as split bamboo. Calibers: 24 inches from butt, ¾ inch; 30 inches, 45-64; 3 feet, 43-64; 3½ feet, ⅝; 4 feet, 19-32; 4½ feet, 9-16; ferrule, capped and welted, 3¾ inches long. Middle joint: Ferrule, 2⅝ inches long, 17-32 diameter; 6 inches, 17-32;



Fifteen-foot Split Bamboo Salmon Rod.



Fourteen-foot Bethabara Salmon Rod.
Figure 43.

1 foot, 33-64; 18 inches, 33-64; 2 feet, ½; 2½ feet, 31-64; 3 feet, 15-32; 3½ feet, 27-64; 4 feet, 13-32; 4½ feet, 25-64; ferrule, capped and welted, 3¼ inches long. Tips: Ferrule, 2 inches long, 23-64; 6 inches, 11-32; 1 foot, 21-64; 18 inches, 5-16; 2 feet, 19-64; 2½ feet, 9-32; 3 feet, ¼; 3½ feet, 7-32; 4 feet, 3-16; 4½ feet, 5-32; at top, ⅛ inch. Top, loose steel ring. Guides, same as on bamboo rod.

Bethabara Salmon Rod.—Length, 14 feet; joints, 57¼ inches; weight, 25½ ounces. Handgrasp, same as on other rods. Calibers: 24 inches from butt, 51-64; 2½ feet, 43-64; 3 feet, 41-64; 3½ feet, 39-64; 4 feet, 37-64; 4½ feet, 37-64; ferrule, capped and welted, 3¾ inches long. Middle joint: Ferrule, 17-32; 6 inches, 17-32; 1 foot, 33-64; 18

inches, ½; 2 feet, 31-64; 2½ feet, 15-32; 3 feet, 7-16; 3½ feet, 13-32; 4 feet, 23-64; 4½ feet, 11-32; ferrule, capped and welted, 3¼ inches long. Tips: Ferrule, 21-64; 6 inches, 5-16; 1 foot, 9-32; 18 inches, 17-64; 2 feet, ¼; 2½ feet, 15-64; 3 feet, 7-32; 3½ feet, 13-64; 4 feet, 11-64; 4½ feet, 9-64; at top, ⅛ inch. Top, loose steel ring. Guides, one agate, balance steel snake ring, fourteen in all.

CHAPTER XIII

ON THE HISTORY OF THE SPLIT BAMBOO ROD

WHEN and where were split bamboo fishing rods first made, and by whom? This is a question that has been discussed in the press of Great Britain and America for very many years. It is generally conceded that the idea originated in England, but the three-section rod was the only development of the idea there; while on this side of the Atlantic—if all available testimony is trustworthy—the four-section rod came first, and the hexagonal method followed very shortly, to stay.

Whether the four-strip rod as made in England was copied from those made here is unknown, or so it seems, but the evidence at hand points to that conclusion, since the four-strip rod was commented on in the English press of the early 70's as something new, whereas four-strip rods had been commonly made here for a number of years previously.

The first mention of glued-up bamboo rods

that I have been able to find bears the date 1805, as appears farther on. One Clark of London was said to be "the unrivalled maker" of such rods, and from this it is natural to infer that other rodmakers were at that time working bamboo into rods.

The first split bamboo rod to be made in America was produced by Samuel Phillipe, of Easton, Pa., in 1845, according to Dr. James A. Henshall, who has devoted a great deal of time to obtaining the facts. This was a four-strip rod.

The first six-strip split bamboo rod to be made anywhere was the invention of Hiram L. Leonard, then of Bangor, Maine. The late William Mitchell—himself a veteran rod-maker—said that the Leonard rods were put on the market about 1870. No improvement worthy of the name has ever been invented to replace six strips for rod joints, and to-day they are conceded to be the last word in rod-making. Seven-strip rods were at one time made, notably by Edward Vom Hofe, of New York, now deceased; and eight-strip rods have been and are still occasionally made by a number of firms; while rods in which the butts are very heavy—as salmon and salt-water rods—are commonly made of six pairs of strips. In

these, two strips of rectangular section are first glued together, to attain the necessary thickness, then planed to triangular section. The method is commonly called "double enamel."

A few British makers claim to have improved the six-strip rod by adding steel centers; by winding with steel ribbons; and by making them of treble enamel. But all these things may better be called selling points than improvements.

In the old-time angling books some writers say the enamel of the cane should be placed on the outside of the joint. That is readily understood, and experience has shown that it is the only reliable method. Other writers mention the placing of the enamel on the inside of the joint. At this day such workmanship would, if advocated, be ridiculed. The first reason for placing the enamel outside is to retain as much as possible of the natural strength of the cane; the enamel surface, being uneven, may be more easily offset by matching if placed outside; and finally, this enamel surface, even when planed down slightly, offers poor holding ground for glue.

In the accompanying sketch Fig. 44 shows a section ready for the glueing of the three strips with the enamel outside. In Fig. 45 one of the



Figure 44.



Figure 45.

two methods that were possible in placing the enamel inside is shown, the heavy lines indicating the enamel side of each strip. The remaining method may have been that illustrated in Fig. 46, but it is hardly to be believed that

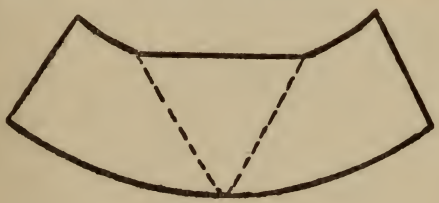


Figure 46.

expert workmen would have cut away all of the enamel in making their strips, since they must have tested strips for stiffness and recovering power, both before and after planing.

There is now, and always has been, no doubt, but a step or two from bow and arrow making to fishing rod building. When good

yew became so scarce in Europe that bowmakers were compelled to turn to other materials, they began to glue two varieties of tough wood together, and such bows were called backed bows, to distinguish them from self bows, or those made of one piece of wood. It is said that the old-time rodmakers employed bowmakers to help them, and as these men were probably experts in making backed bows, it is likely that they suggested splitting canes to obtain excellent material for rods or parts of rods.

If Phillipe, the gunsmith of Easton, Pa., was the originator of split bamboo rods in America, as it is claimed he was, it is just possible that he, too, obtained the idea from one of the old bows; for at that time it is likely that imported bows were more common in America than imported fishing rods.

It has also been suggested that Phillipe might have seen an English rod made of three strips of cane glued up, and at once concluded that a better rod could be made of four than three strips. But it is not likely that he was a copyist, since Dr. Henshall mentions several articles that he made, as well as rods. Living, as he did, far in the interior, it is more reasonable to believe that he worked out the four-strip idea without assistance of any sort.

The extracts and comments which follow will, I believe, be read with more than passing interest by the young anglers, few of whom have ever seen a four-strip split bamboo—or, as our British cousins call it, split cane rod. And yet, it was only ten years ago that I watched with interest the making of four-strip rods by one of the old-time gunsmith-rod-makers of the Middle West.

Through the kindness of Hugh T. Sheringham, angling editor of the *Field* of London, I have succeeded in obtaining the following from "Fishes and Fishing," by W. Wright (London, Thomas Cantley, 1858):

"In 1805 I became acquainted with a Welsh gentleman, Mr. L., whose description of fly fishing for trout and sewin fired my imagination, and I determined to become a fly fisher. . . . At my request he (Mr. H., not Mr. L.) introduced me to an old Welshman named David Williams, whom Mr. H. had drilled into making rods according to his plan; this Williams was acquainted with Clark,* the unrivalled maker of glued-up bamboo fly rods,

*Mr. Sachs said of Clark: "I have endeavored to find out who this Clark could have been, but even the assistance of one in the forefront of the trade, who can command tradition going back eighty years, could produce nothing definite. The only Clark was one living at 11 St. Johns Lane, Clerkenwell, but tradition does not record him as a maker of built-up rods."

the most excellent of all rods. I obtained about ten sticks of the proper cane, and Williams induced Clark to make one for me, and another for my friend, Mr. L."

Mr. Sheringham adds that in the *Field* of March 26, 1904, E. T. Sachs "speaks with certainty of one Ustonson of Bell-yard as a maker of such rods (built up), though not of cane, and there was another maker living in a West of England town. Ten years or so since I was shown a built-up rod by the late Mr. Chevalier, formerly in Bell-yard, which had been made some sixty years previously.

"When the first six-strip rod was made I do not know," Mr. Sheringham concludes, "but I am informed by an old established tackle maker that Eaton & Deller of London, E. C., were the beginners on this side, and that they got the idea from your side."

While Mr. Sheringham thinks that Eaton & Deller were the first to copy the American hexagonal rods, R. B. Marston thinks differently. In a personal letter to me he said:

"In the 70's, I believe, J. D. Dougall, a gunmaker of Glasgow, was the first to import these rods [hexagonal], and then Bowness of London. The hexagonal American split canes were a novelty and very expensive; but our

makers soon began to make them, and now I doubt if you could tell whether one was made in England or America—that is, the best makes."

With this opinion I cannot agree, although I will admit that the best makes of British rods exhibited in this country during the last three years have been far superior to the same sort sent over ten or more years ago. In some of their so-called best rods the joining of the strips is very bad, while for some reason best known to themselves, British makers stubbornly cling to those abominable contrivances, the lock-fast ferrules, and refuse to believe—what was common knowledge on this side a generation ago—that there is no other ferrule worth while than our common German silver suction ferrule. Using brass as they do, it is not to be wondered at that they cannot make these "stay put," and must perforce resort to locking devices.

Our makers stand on the platform that six strips of cane cannot be improved in any way known to science or art. On the other hand, we find British makers resorting to all sorts of devices that are alleged to be intended to stiffen or strengthen their rods. Some put steel centers in the joints; others wind the joints spirally

with narrow steel ribbons — both methods clumsy attempts to bolster up an article that evidently needs heroic treatment.

There are firms in the United States that make up butts and joints and strips of split bamboo and ship them in very large lots to Great Britain. These are made by machine from all grades of cane. The query naturally suggests itself, Do these parts appear later in the British market as British rods?

At another time Mr. Marston said:

"I think the first Englishman to make the modern hexagonal American split cane rod known in England was a man I knew—a good all-round sportsman, who hunted, shot, and fished in all parts of the world, well known in sporting literature as 'Ubique,' which well described his roving spirit; his real name was Parker Gilmore. . . . In 1869, in his interesting book, 'Gun, Rod, and Saddle,' he had referred to American fly rods. On page 251 he says:

"'Next to the cedar rod, but one that will stand any amount of fair work, is the split bamboo; this, I think, can be procured even lighter than the former. There is a firm, the Messrs. Clark [evidently Clerk] of Maiden Lane, New York, who make this a *specialite*.

I never had the good fortune to use one, but have handled them often and listened to the raptures of experts on their merits; on their good qualities I believe I can say nothing that they do not deserve, but their price is necessarily high, from the care with which the cane has to be selected and put together.'"

The late William Mitchell of New York City said that the first split bamboo rod that he ever saw or heard of was made by William Blacker of London, and to order, for James Stevens, of Hoboken, N. J. Mr. Mitchell repaired this rod in 1852, and made a rod for its owner in the previous year, keeping a record of both dates. In the *American Angler* of May 19, 1883, Mr. Mitchell gives these additional data on the subject:

"About 1860 E. A. Green of Newark, N. J., made the first complete split bamboo rod. This date cannot be far astray, for Mr. Green made —that is, glued up—for the trade a few; and I find my record, made at the time, to be Sept. 16, 1863. These rods were made in four sections. . . . In 1863 or 1864 Mr. Murphy, an acquaintance of Mr. Green, commenced to manufacture split bamboo rods for the trade. These were in four sections.

"The first rods constructed in six sections

that were put into the market were made by H. L. Leonard of Bangor, Maine. This was about 1870, and Dr. A. H. Fowler soon followed. Mr. Murphy, however, claims to have made one some time before.

"The first split bamboo rod that I made myself was in June, 1869. It was put together in four sections; made, not of Calcutta bamboo, but of Chinese, which is much harder, homogeneous, and more difficult to obtain than the former."

As Mr. Mitchell was, in his time, one of the really great rodmakers, it is of more than passing interest to give his opinion as to the value of the enamel on Calcutta bamboo. Referring to the burning of the culms, he says that, as you cannot retain all the enamel on the rod, it is just as strong if all the enamel is taken off; in fact, the enamel or silex on the outside of the bamboo only stiffens but does not strengthen it.

While all the available testimony seems to show that three-strip cane rods were made first in England, the following paragraph is of particular interest, as it leads us to believe that four-strip rods were new in England in the early seventies. It was printed in the London *Field* on May 3, 1873:

"We have been requested by Mr. Farlow to inspect and test one of his new quadrangular glued-up bamboo rods. Those rods are made of four splints of bamboo, cut into quarters and laid together very neatly, stuck with some strong cement, and further secured by being tied with a half-dozen turns of silk every two inches; thus the outside of the rod is one hard surface of the tough, pliant skin of the bamboo, the softer and more pithy part being towards the middle.

"The idea of so constructing rods is not new, but formerly they were made in triangular splints instead of quadrangular; whether it was from this circumstance or from the workmanship or the cement being less perfect we cannot determine, but the old rods, though they possessed great power over a fish, yet certainly had less spring and less power of recovery, and after a good pulling and straining did not go back to the straight line so well as these do, and consequently did not cast as good a line. With one of these little rods, which is light enough for a lady to use comfortably, we cast twenty yards of line with ease at the first essay, with a nasty cross wind blowing; and that is enough for any single-handed rod to accomplish."

It was Dr. James A. Henshall of the United States Fisheries Bureau who said (in his "Book of the Black Bass") that "although the manufacture—as it is at present—is of American invention, the idea, or the principle, is of English origin."

In September, 1912, Dr. Henshall wrote as follows in the *Fishing Gazette*:

"In the first edition of the 'Book of the Black Bass' (1881) . . . the date of Phillipe's first rods was given as 1848, which date was doubted by W. Mitchell, who believed it should be 1866, on the authority of Dr. Wilkinson's salmon article in *Scribner's Magazine*.* But this assumption was not true, as Dr. Wilkinson afterward wrote me as follows: 'You are certainly right on the split bamboo question. Mitchell gives the date of Murphy's rods as 1863, and Murphy concedes priority to Phillipe, and the latter's date is 1846. At the time of writing I could not fix Murphy's exact date. I am now clearly of the opinion that Phillipe's son carelessly wrote 1866 in place of 1846, and, in fact, I remember perfectly well that his figures were pretty difficult to decipher.'

*Dr. Wilkinson said in *Scribner's Magazine* (1876) that in 1866 a gunsmith of Easton, named Phillips, made a split cane rod in three sections.

"In the revised and extended edition of the 'Book of the Black Bass' (1904), there is much additional information on the subject, and the date of Phillipe's first rods is established as 1845 on the testimony of contemporaneous fellow-townsmen, friends, and fishing companions. From the evidence now in my possession, Phillipe was undoubtedly, indubitably, and manifestly the first to make a four-strip or six-strip split bamboo rod. Some of his earliest rods were made with an ash butt and the middle and top piece of four-strip split bamboo, one of which is now in my possession, and was made some seventy years ago. It is 11 feet 4 inches in length, and weighs scant 8 ounces. It is well balanced and as perfect in action as any modern rod.

"The rods shown at the 1851 Fisheries Exhibition by English rodmakers were all three-strip split cane rods, as was also the rod mentioned by Mitchell as made for Mr. James Stevens by Blacker of London in 1852. The late Prof. Alfred M. Mayer of the Stevens Institute of Technology, and editor of the Century Company's 'Sport With Rod and Gun,' says of this rod: 'This rod is of three sections, with the enamel on the outside, and was made in 1852, while Mr. Stevens was in

London. This date has been accurately determined for me by his son, Mr. Frank Stevens.'

"At the Chicago World's Fair, in 1893, I had on exhibition in my department a number of Phillipe's rods of four strips and six strips of split bamboo, in addition to the one with the ash butt, just mentioned.

"Phillipe's son, Solon C. Phillipe, informed me that his father made four-strip rods as early as 1845, and that his books show that the first rod made for sale was in 1848 and was a four-strip rod in three pieces, all, including the butt, of split bamboo. He was also a gunsmith and a skilled workmen in wood and metal, and at one time received a silver medal at the Franklin Institute Fair, Philadelphia, for a violin, and also made the first 'Kinney' fishhook from a pattern furnished by Phineus Kinney of Easton, Pa.

"Archery bows and rod tops, and probably entire rods, were made of hickory or other hard woods in England long before Phillipe made his first split bamboo rod; but it is not at all likely that he knew or even heard of such rods, living as he did in a small interior town in Pennsylvania. He at first made rods only for his own use or for friends, several

years before he made them for Andrew Clerk & Co."

An excellent description of the method of making split bamboo rods is found in the first edition of Edward Fitzgibbon's "Handbook for Angling," London, 1847. As to the construction of a salmon rod, he says he obtained the following from Mr. Little, of 15 Fetter Lane, rodmaker to His Royal Highness, Prince Albert:

"They [the top and middle joints] are to be made from the stoutest pieces of bamboo cane, called 'jungle' and brought from India. The pieces should be large and straight, so that you can rend them well through knots and all. Each joint should consist of three rent pieces, split like the foot of a portable garden chair, and afterward glued together, not with knot opposite to knot, or imperfect grain opposite to imperfect grain, but the best part opposite to that which may be knotty or imperfect, so as to equalize defectiveness and goodness. The natural badness of the cane you counteract by art, and none save a clever workman can do it.

"The butt of a salmon rod should be made of plank ash or ground ash, though many good judges prefer willow or red deal, as being

much lighter, and where lightness is required the whole rod may be made with cane. The few makers that have as yet attempted solid cane or glued-up rods, have generally placed the bark or hardest part of the cane inside in glueing, and then reduced the joints down on the outside to the usual tapering shape. Give me, however, the workman who glues and splices with the bark outside, and then gives his rod a true and correct action, allowing the three different barks to be seen visibly on the outside after he has rounded the whole. If the pieces are skilfully glued together they will require no reduction except at the corners, to bring the rod from the three square to the round shape. I am prepared to prove that there are no more than three men in London capable of making, perfectly, rods of solid cane, rent, glued, and then correctly finished with the bark lying on the outside.

"In my opinion rods made entirely of lancewood," Mr. Fitzgibbon says, "are the worst; and those made entirely of rent and glued jungle cane are the best. They must be most carefully fashioned, and no maker can turn them out without charging a high price. I am also of the opinion that they will last longer

than any other sort of rod, and are far less liable to warping. I have a high opinion of their elasticity, and Mr. Bowness, fishing tackle maker of 12 Bellyard, Temple Bar, showed me once a trout fly rod made in this, my favorite way, that had been for many years in use and was still straight as a wand. I never saw a better single-handed rod."

Fitzgibbon underwent a change of heart within a year, however, for in the 1848 edition of his book he says:

"I have changed my opinion with respect to rods made entirely of rent cane, or any other wood rent. Their defects will always more than counterbalance their merits."

William Blacker said, in his "Fly Making and Angling," London, 1855, page 82:

"The rent and glued-up bamboo cane rods, which I turn out to the greatest perfection, are very valuable, as they are very light and powerful, and throw the line with great facility."

In the edition of Walton's "Compleat Angler," edited by Edward Jesse and published in London in 1856 by Henry G. Boehn, the following paragraph appears:

"The split or glued-up rod is difficult to make well, and expensive. It is made of three

pieces of split cane, which some say should have the bark inside, some outside, nicely rounded."

In "The Practical Angler," third edition, Edinburgh, 1857, W. C. Stewart says:

"The strength of bamboo lies in the skin, and in order to turn this to best account, rod-makers lay two or three strips together so as to form a complete skin all around. Rods are sometimes made entirely of bamboo, but they possess no advantage over those in common use to compensate for the additional expense, a twelve-foot rod of this material costing £3 to £4."

Le Pecheur, the French angling journal, says:

"Thomas Aldred of London claimed, and no one has disputed his claim, to have the honor of inventing the split cane rod in three sections or segments glued together. As regards the date when the first rod was made we are ignorant.* It must have been before

* Commenting on this statement, Editor Marston of the *Fishing Gazette* says of split cane rods: "They were made and exhibited at the first great International Fisheries Exhibition—that of 1851. They were exhibited by Aldred of Oxford Street, and thirty years ago and more I used to know a very clever little old rodmaker, Irvine by name, who lived in a court off the Pentonville road near the Angel, Islington, . . . who told us that he had made the salmon and trout split cane fly-rods for Aldred for the 1851 Exhibition and long before. . . . Irvine was proud of saying that he had made the split

the 1855 Exhibition. There were three fishing tackle exhibitors at the Exhibition, namely, Ainger and Aldred, J. Bernard, and J. K. Farlow. The canes were all split in three sections longitudinally, the whole length of the joint, and not made up of different pieces in length equal to the distance between the knots. This same rod was exhibited by Ainger and Aldred in New York in 1853."

While *Le Pecheur's* article is interesting, the paragraph quoted did not originate with it, but was taken bodily from an article printed in the *American Angler* in 1883.

W. D. Coggeshall of the London Fly Fishers' Club has found this paragraph in "The Young Angler's Companion," published by James March of London, without date, but which, judging from the costumes of anglers in the colored prints, Mr. Coggeshall concludes was issued about 1810 to 1820:

"The Fly rod is generally made of Hiccory, with a top of several pieces joined to-

cane salmon rod on which the Lord Lovat of the middle of last century had, so he told him, killed tons of salmon, when he had sent it or taken it to him to repair—very likely at that time, when he was a young man, he worked in Aldred's shop These first English split cane rods certainly date back to the forties of last century. They were made of three pieces, glued together sometimes with the inside outside and sometimes with the outside inside, and were made more or less cylindrical, showing no external angles as in the hexagonal rod, which latter was undoubtedly the improvement of the Americans."

gether, cut out of the solid part of the large bamboo; the butt is sometimes made of Ash."

I quote Mr. Marston again:

"In Blaine's 'Encyclopedia of Rural Sports,' first edition, 1840, in his description of the manufacture of fly rods Blaine specially mentions split bamboo. In 1836 Ronalds, in the first edition of his incomparable 'Fly Fisher's Entomology,' refers to bamboo top joint for the fly rod, and I am pretty certain he means split bamboo, for in an edition twenty years later he has the same expression, and it is pretty certain he did not mean the actual 'whole cane' natural end of a bamboo. . . . The fact is, bows for archers were made of several pieces glued together long before rods were so made, and it was the custom of fishing tackle makers to get the bow and arrow makers to help them in their rodmaking. Chetham of Smedley, near Manchester, in his capital little 'Angler's Vade Mecum,' published in 1681, two years before Walton died, describes how you are to get the arrow maker to saw up and plane up wood for rod making."

In a letter to me Dr. Edward Breck, author of "The Way of the Woods," throws an interesting sidelight on split bamboo rods when he says:

"While in England I met several old anglers, some of them in the fishing clubs, who all asserted that split cane rods had been made in England years ago, but had not taken very well and been dropped. Afterward I found evidence that seemed to confirm this. Henshall says 'English origin' in his 'Book of the Black Bass.' In England I was told that, as the old chaps remembered the matter, only the middle joint, and sometimes the top, were glued from strips, the butt being ash or greenheart, but the principle is what counts, of course. The sections were three or four only, so the old boys said. Of course such faraway evidence is merely significant.

"In some of the older, small shops in London I saw some split cane rods that certainly looked as old as the proprietors said they were—sixty or seventy years—but this again is not strictly evidence. . . . At the first World's Exposition in London in 1851 three firms exhibited three-strip rods, and in 1855 Blacker was making them commonly, generally of three strips."

In a later communication Dr. Breck wrote:

"*Re* Mr. Coggeshall's claim, that the English were not using split and glued bamboo, all one has to do is to quote from Fitzgibbon's

1847 book: 'They are to be made from the . . . bamboo cane called "jungle," and brought from India. . . . Each piece should consist of three rent pieces. . . . The butt of a salmon rod [as distinct from trout rod] should be made from plank ash. . . . Give me the workman who glues the splices with the bark outside.'

"Now, as to the four- and six-strip rods, I can only say that I never heard anybody in England mention, nor read about six-strip rods in the early days. Of four I think I have, but will not be sure. The above extract proves that middle sections, and probably the butts of trout rods, too, were made of split and glued bamboo, not the tops alone, as Mr. Coggeshall claims."

CHAPTER XIV

SPLIT BAMBOO RODMAKING FOR THE BEGINNER

FEW amateurs attempt to make split bamboo rods because they believe the work is too complicated. It is at once a difficult and yet a very simple proposition, as will appear later on. Good material properly worked up will give you a first-class rod. Patience and perseverance are necessary, for the preparatory work requires great care, and the least slip of plane or file may ruin an otherwise perfect strip.

You cannot copy a wood rod in bamboo, for aside from the fact that they are essentially different in every way, you can always measure the exact diameter of your wood rods, but must measure the "flat" surfaces of the hexagonal bamboo, and these do not give true calibers. Neither can you hope to determine its calibers in the professional way. Long experience tells them where a rod needs strength, and where it should be tapered rapidly. Even in examining one of their rods you will not notice the slight variations at certain places,

which seem trivial to you, but are the result of burning much midnight oil and trying, altering, testing to attain perfection.

In making each of the strips you halve the actual caliber, but only approximately. Finally, you must work very slowly. If you finish six perfect strips of whatever length in a day you will work faster than you should. Remember that you cannot use your split bamboo rod as soon as finished, as you can a wood rod. Therefore, go slow.

These remarks are not intended to discourage you, but rather to make you cautious. The first time I actually finished six strips of bamboo and began to glue them, my hands trembled so that the work was very poorly done; for I had been told that I could not do it, and I half expected them to fly apart despite the excess of glue on the strips, on my hands and on the floor. As a matter of fact, you will be delighted—just as I was—and the result will be much more satisfactory than you anticipate.

If you decide to use Calcutta, select several canes 1¼ inches or more in diameter at the large end, having in mind the fact that the burns must not penetrate the enamel. Pound each piece smartly on the floor and examine

closely for worm holes, and the dust from them. Cut the pieces at least a foot longer than the finished joint is to be. Split them through the eyes where the leaves grew, for this part is worthless. An old table knife will serve the purpose. This will leave about two-thirds of each cane from which to make selections. Split up enough to give you six good pieces, and plane two sides of each strip, leaving it nearly square in section. Keep in mind the fact that the rind or enamel is not to be touched with any tool. In squaring up the strips approximate the taper of each one, but otherwise do not disturb the pith side.

Examine each strip carefully for worm holes, and if there is the slightest indication of these in it, break it up and thus avoid any possibility of its being used. Worm-eaten bamboo is the bane of the rodmaker.

File the knots slightly and lay the strips side by side, rind up. Now note the burns again, and if any of them char the enamel, reject that strip and try another one. Next try the strips which contain the leaf eyes, bending them in every direction and noting the arch as well as their inclination to set. If they will not spring back straight, particularly when the rind is on the convex side of the curve, they may not be

properly seasoned. If faults appear in these rejected strips, examine their mates, which you propose to use, but do not subject them to severe strains. The weeding out of poor material, if it is done at this stage, may save time and labor later on. See that the bamboo has no greenish hue, indicating that it is not seasoned. It should be yellow and split far ahead of the knife blade.

If six strips pass inspection, place them so that no two knots will be opposite or even near each other, saw off ends and mark all of the strips, so that they cannot be reversed by accident. Dipping the butt ends in red ink is a good plan. Number them from 1 to 6 on the rind side. They should be some three inches longer than the finished joint is to be, so that you will have leeway in trimming the ends.

Sharpen your plane on an oilstone until its edge is very keen. Bamboo requires the utmost care in planing, and a dull tool must not be used on it. Set the plane very fine and test it on a rejected strip of cane. It is well, too, to put an old glove on your left hand while you hold the cane in place in planing and filing it. A slip may result disastrously, for the rough edge of a triangular strip of cane will make a jagged wound.

If your material is Tonkin cane, practically the same rules laid down for Calcutta may be applied to it, though Tonkin generally seems to be free from worm holes.

You will know how to bevel two sides of each one of your strips, to make its section triangular, with the apex exactly opposite the center of the enamel base, and the angle formed by the two sides to be 60 degrees, as illustrated in Fig. 50, p. 162.

There are "forty-'leven" ways to do the rough beveling, and as many more methods employed in finishing the strips. You can begin to bevel the strips in the grooved edge of a tongued-and-grooved board. Another way is to nail a strip of wood near the edge of your work bench, forming a right-angled rabbet. Some rodmakers use a hardwood block with rabbets cut in two corners. Still another plan is to prepare two blocks like those illustrated



Figure 47.
Blocks for Beveling Rod Sections.

in Fig. 47, with the angle of the groove 60 degrees.

I like the grooved board referred to in the chapter on "One-Piece Bait-Casting Rods." You can procure a piece about four feet long and keep it handy. It is serviceable for rounding wood rods, for squaring bamboo strips, which lie well in the groove; and for the preliminary beveling of these strips. This piece of board, and the hardwood block illustrated

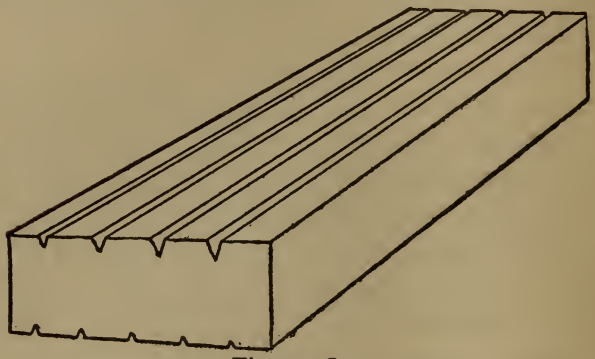


Figure 48.
Grooved Board for Cutting Bevels.

in Fig. 48, will answer all your requirements in split cane work.

Some amateurs, however, like to use blocks similar to those illustrated in Fig. 47. To make these, procure two pieces of seasoned hardwood. Cherry, birch or maple will be better than oak; beech will answer. Make the blocks 4 feet long, 2 inches wide, and 1½

inches thick. Plane off the corners as indicated by the dotted lines in Fig. 47. Plane very carefully, a little at a time, then fasten the two blocks temporarily in the vise while you test the groove with the handy little gauge



Fig. 49.—Steel Angle Gauge.

illustrated in Fig. 49. This is a center gauge costing 25 cents at hardware shops, and it not only has three 60-degree notches, but scales graduated in 14ths, 20ths, 24ths, and 32ds of an inch. As it is tempered steel, you can true up the groove with it and with a three-cornered file from which the handle has been removed. Both the gauge and the file have angles of 60 degrees. The depth of the groove does not so much matter as its shape, for on this depends the character of your finished strips.

When satisfied that one of the grooves is correct, fasten the two blocks together with at least four screws, reverse and true up the other groove.

We will assume, for the sake of brevity and

simplicity, that your first groove is to be for the rough beveling of the strips of the butt joint of a two-piece rod, whose diameter at the large end is to be 15-32 of an inch, and at the small end 9-32. We will also assume that the depth of the groove is uniformly ¼ inch from end to end. Secure the block against shifting and plane its face until the depth of the groove at one end is 15-64 and at the other 9-64 inch. To be certain there are no uneven places, test with a straight edge, both lengthwise and across the block, then mark its entire face with a pencil.

The depth of the second groove will range from 9-64 to 3-64, assuming that the tip end of your rod is to be 3-32 inch when finished.

Now place a squared strip of cane in the large groove of your block, with the rind at one side, and take off a very fine shaving with your plane. Turn the strip and plane the other side, being careful to go over the knots with a shearing motion, else the plane will "bite" into the knots. See that you do not cut into the face of the block, which you marked with pencil for this purpose.

By this time your strip will be roughly triangular, but the edges should not be sharp. Take up another strip and bevel it in the

same fashion and so on until the six strips are ready for the finer work.

Turn the block over and bevel the strips for the tips in the shallow groove, then lay the block aside. Some amateurs finish their strips in grooves of this sort, but it is so difficult to make a perfect groove of this length, and to prevent the strip from rolling, that the following method is the better one for beginners:

For this purpose procure a block of hard maple, birch or beech, two inches thick, 2½ inches wide and 6 inches long. Make it fast in the vise and with a pencil draw four parallel lines from end to end. With a saw cut shallow grooves on these marks. Take up your three-cornered file and cut the first groove. Its bottom will be slightly round, as the edge of the file is rather blunt, but you can true up the groove with the point of your steel gauge (Fig. 49). Cut the first groove 15-64, the second 13-64, the third 11-64, and the fourth 9-64 inch deep. In this work the utmost care must be exercised to keep the top side of the file level with the surface of the block, to keep the angles of the groove perfect.

Turn the block over, draw four or five lines

as before, groove them with the saw, and file the grooves. (See Fig. 48.) Make the first one ⅛ inch deep, the second 7-64, the third 3-32, the fourth 5-64, and the last one 1-16 inch deep. These are for your tips, which require the greatest care; therefore the grooves may be safely made uniform in depth and you can shift steadily to a smaller groove as you file from the large to the small end. Cover both faces of the block with pencil marks, to assist you in keeping the file out of contact with the block.

Fastening this block in the vise with the larger set of grooves up, begin with one of the strips for the butt of your rod. Lay it in the largest groove with the enamel at one side, and commencing at the butt end work your flat file forward and back, being careful to hold it parallel with the fack of the block. Turn the strip often, in order that you may be sure to keep the angles true, and go from groove to groove until the strip is reduced evenly throughout its length, beginning again in the largest groove and continuing as before, until the strip will lie in the groove flush with the surface of the block, no matter which side is uppermost. Do not attempt to file across the grain of your strip, as it will sliver if you do.

The plane cannot with safety be used in finishing strips in the short block. The proper tool for this is the flat file.

Test all angles of the strip frequently with the little steel gauge, going from end to end, filing, testing, sighting along the strip, blowing the dust out of each groove before laying the strip in it.

Proceed in like fashion with the other strips, each one of which must be an equilateral triangle in section; that is, excepting the convexity of the rind side. In other words, the apex of the triangle must be exactly opposite the center of the enamel base, as in Fig. 50, and the angle formed by the two pith sides 60 degrees. Each of the edges must be sharp, and in order to make them so, be careful that you do not raise a sliver at the enamel edges, and in removing it destroy the perfection of the glue joint.

Turning the grooved block over, take up your strips for the tips. Even greater care is necessary with them, for they run so small at the tip end that the least error will ruin one. Use the gauge frequently. Do not be satisfied with a fair strip; make it perfect. Keep in mind the fact that you cannot use the rod for several months, anyway, and that a

day more or less in finishing strips will not matter.

I have said split cane rodmaking is both difficult and simple. If you will be careful and patient, the difficulties will be overcome.



Figure 50.



Figure 51.



Figure 52.

Single Strip Section, Double Strip Unfinished, and Double Strip Finished Section.

Could anything be more simple than this little block of hardwood, which you can carry in your pocket, and which is easily made, yet is in fact a mold for all the strips of your rod? Despite all the advances in toolmaking and in labor-saving devices, some of the most expert rodmakers use this little hand-made block of wood.

By the time you have finished the six strips for the tip of your rod, you will have acquired great respect for the six-inch block. In a block the full length of a strip the tendency of the latter to roll is very aggravating, but in the short block this is greatly reduced, although not entirely overcome, it being difficult to hold even this short length against rolling when the enamel side is convex.

It must be understood that one set of grooves will serve for a long one-piece rod, for one part of a two-piece rod, or for one part of a three-piece rod, provided their number and depth are properly regulated. The angle for all is the same, and the notches in your steel angle gauge will be correct for testing all strips.

There are many other methods employed in beveling and tapering strips, as I said before, but the simplest one is given here, for if the beginner is confronted with a complicated system involving planes fitted with bevel blocks, adjustable "shooting boards," taper gauges and protractors, he cannot be blamed for shying from this interesting branch of rodmaking.

When your strips are finished, their glassy surfaces may seem to be poor holding ground for glue, and you may be tempted to roughen them. This is a mistake. To satisfy yourself, wet one of the surfaces slightly, and after it has dried pass your finger over it. You will find the grain raised enough to prove that this will be taken care of by the hot glue.

Fit a set of six strips together and wind them spirally with thread, so that they will all be in perfect contact. Examine all parts

carefully and see that the pith sides come together throughout, and that no strip sinks below its proper plane, as it will do if its taper is not the same as that of the other strips. In this case a new strip must be made to replace it. Cheap rods are often corrected for this fault by winding a narrow piece of paper spirally around the imperfect place in the strip, then removing the paper from the surface after gluing, but this is not to be recommended, as you would regret it later on, perhaps by the seam opening. Gauge carefully the taper of the assembled strips and mark all places that need further reducing.

In a preceding chapter I said that double enamel rods are excellent if carefully made. In working thin-walled cane this system has some points of excellence, and the amateur who is skilled with the plane and the file can work it nicely, especially for butts and middle joints.

Square up the rough stock and match two strips with reference to the knots. Decide which is to be the surface strip and plane it to rectangular section, with the rind on the bottom. Do not touch the rind. Now plane the second or inner strip to match, but file off just enough of the rind in the center to make

a glue joint, it being remembered that the convex rind of the inner strip cannot otherwise be glued to the pith side of the outer strip. Glue the strips together, wind with cord, place under a weight or clamp together until dry. In section your double enamel strip will be like Fig. 51, while Fig. 52 shows the sectional view of a finished strip. It is best to make the outer strip thinner than the inner one, as in this way the maximum of rind is obtained.

It must be understood that in filing the rind of the inner strip, only a very small portion of its center is to be removed. This will affect the strip very little when the two are glued together.

It is not advisable for the beginner to try this method on tips until he has mastered the less complicated hexagonal work, if at all.

When your assembled strips are ready for gluing, warm them while heating the glue, and for each set of strips have ready a piece of strong thread. You can glue the strips with another person's assistance. To do this, glue a few inches at a time, your assistant keeping them separated for the purpose. Wind them spirally, glue a few more inches, wind again, and so on until finished, then wind back to

the place of beginning. Whatever the method, pass the strips over a flame before pressing them into contact, in order to be sure the glue is hot, and after the strips have been wound in one direction they can be again passed over a flame, then the reverse winding completed. Use the best French glue, applying it with a flat brush while very hot. Before using fresh glue soak it over night in cold water. It should be quite thin.

Now sight along each strip alternately and correct the natural tendency to twist spirally. Rolling in the hands while gluing will partially correct this. Fasten the glued stock on a board or a rod by winding loosely around both, to prevent warping.

Glued joints should be left in a warm room until thoroughly dry. A month is not too long, and some of the best rodmakers dislike to let rods go out of their shops if the stock has had less than four months to dry and harden. As a rule they glue their stock in the autumn and make up rods from it the following spring, these rods being kept out of the anglers' hands for six months at least. Tournament rods should season even longer, for they are put to the severest tests.

Some of the most practical suggestions that

have been made to me are those for which I am indebted to P. S. Redfield of Providence, R. I., a veteran angler. I take pleasure in recommending all that he says:

"If you will pardon me, I would like to make a simple suggestion as regards gluing split bamboo for rods. As you know, all labor is lost and bitter disappointment follows if the gluing prove defective. After various failures in gluing bamboo strips together, it occurred to me to devise some simple but sure method of gluing, and the following glue-pot was invented: Get a piece of common speaking tube, such as were formerly used in houses to call the kitchen girl to the chambers or dining room. One inch in diameter is sufficient and 2½ feet long. On one end solder a piece of brass or copper three inches square, for a base, and it is ready for the thin, hot glue that has been freshly prepared in a sauce-pan set in another dish of boiling water. The glue should thus be well cooked—say an hour—stirring frequently with a thin wood paddle.

"Enough glue should be thus prepared to about fill the tube. Now set the thing in a tea-kettle of boiling water and the glue will keep hot—a very important thing for success—till you glue all your pieces. When through using,

and while the glue is hot, empty the tube and rinse well in hot water till perfectly clean of glue, dry, and hang bottom up for further use.

"Too much care cannot be taken to prevent rusting this tube—as rust and dirt will spoil glue—and so much depends on the gluing.

"I need not tell how to use this glue-pot, as you have already given directions to have the pieces for each joint wound spirally with coarse thread. It will be well to unwind a few inches at a time, commencing at the small end. As the piece is unwound, and pushed down in the glue, it will act like an egg-beater, and consequently glue all surfaces. When half of a piece has been thus unwound and whipped in the glue, wind the thread back, pressing the strips together and the glue out; then unwind the other end to a little beyond where the glue reached before, thus surely gluing every part; then rewind and have a rag handy in a dish of hot water to gently wipe most of the glue from the outside of the joint. Do not wipe too clean, for if a little glue is left on the thread, all the better, and no trouble will be found in taking off the winding."

I have found that a piece of one-inch galvanized iron pipe makes an excellent glue-tank. The plumber will supply it. Have him put a

screw-cap on the bottom end. Being thicker than tin, it retains the heat longer.

Remember that no matter how perfect your glue joints are, if your gluing is badly done, your work will be wasted. It is folly to attempt to glue strips in pairs, then glue and assemble the three pairs. As your object is to get all the glue possible into your joint, then get all of this out that can be excluded by winding tightly with cord, the best way is to glue and wind, glue and wind, until you finish the joint, always heating the applied glue before winding. Thick glue simply cannot be used. I found this the most difficult part of split cane rodmaking—at first—but I practiced on short pieces until I mastered the work, and in this way learned how to properly glue the longest strips. Tips are the most difficult to glue, as they are so small that it is at first hard to prevent twisting them in gluing. If this occurs, however, or if the joint be crooked, correct it, after the windings have been removed, by heating and twisting or bending until the joint is straight.

When the stock is dry the double spiral windings are taken off and the surplus glue removed, then the bamboo is rubbed very lightly with the finest sandpaper and the cor-

ners rounded slightly. It is then ready for handgrasp and ferrules. I prefer to rub lightly with varnish and let this dry before winding. Split or serrated ferrules should be used on bamboo rods in preference to the ordinary capped ferrules, and in fitting these only the corners of the bamboo should be removed.

To recapitulate: In order to lead from step to step without a break, I have tried to describe how the butt and tips of a two-piece rod may be made. It naturally follows that a three-piece or a one-piece rod is made in the same fashion, the depth of the grooves in your little block varying to accord with the caliber of the rod-to-be.

I would, however, advise you to make several experimental sections of cane before attempting full length strips; in other words, to practice with short pieces until you master first principles.

In order to do this, make your six-inch block (Fig. 48) first of all. Take some rejected strips a foot or two in length and bevel and finish them with great care, having in mind a certain taper and following this religiously. It is surprising how quickly this will teach you the niceties of the system. The short pieces will be handy to fit and glue together, and later

on you can saw them in two and inspect their ends to see just how your work turns out. You can also determine which glue seems best. Go even further and keep these sample pieces, to see how much you have improved in your work from time to time.

CHAPTER XV

SPLIT BAMBOO RODMAKING FOR ADVANCED WORKERS

WHY is it that so many anglers go in for tournament casting? Has the answer ever occurred to you ? Because in that pastime one learns so much more concerning rods and reels and lines than it is possible to acquire on the stream. On the platform many theories are tested, and mental notes made, for use in the little workshop at home.

Half the fun—yes, more than half—is had in the cold season, when there is neither fishing nor casting practice, in repairing, altering, or making rods to be used in the spring and summer. Rodmaking is a pastime in itself. There is no closed season; in fact, the rainy days, the stormy nights, the winter holidays, are the times to practice it. Try it, you who think you cannot make a rod. As for a shop, any vacant room, or a corner in a basement, will serve, while as for tools, only a few simple and inexpensive ones are needed.

Make solid wood rods, if you prefer, for a starter, to "get your hand in," but do not fail to attempt the making of at least one split bamboo rod.

This work is really not so difficult as it may seem. Careful, patient attention to details and sharp tools are the principal items to be looked after. And the work is so fascinating that, after you have had a little practice, you will grow as enthusiastic over it as the fly- and bait-casters do over their practice on the platform.

Much has been said and written in praise of hand-made cane rods and in condemnation of machine-made rods. In this instance, by "machine-made rods" I do not include the cheap and nasty stuff that is turned out from the sausage mills.

But let a man who is a past master at hand work operate a machine that will do the tapering and beveling of the selected strips better than he can ever do with plane and file, and it stands to reason that the strips turned out will be perfect. All of the other details being cared for in the most painstaking manner, it must be conceded that he can finish the strips better by the use of a finely adjusted machine than it is possible for him to do with hand tools. The shaping of the strips being cared

for in this way, it remains for him to see that the material is of the best, that the roughing out be well done, that there be perfect matching, and that the glueing, straightening, and mounting be up to standard.

The equipment for machining strips may be very simple. Take a common lathe, and procure two thin milling cutters which, when fitted together on an arbor, will cut a strip at the proper angle—60 degrees. Make fast to the bed-plate of the lathe a cross-piece of suitable material, rabbeted or grooved to take a slide. This slide may be hand, screw, or rack-and-pinion operated in several ways, each effective and simple. To it the prepared strips of cane may be attached, by temporary glueing or otherwise. Two things then remain: (1) To work the slide carrying the cane strip through the revolving cutters; and (2) to raise or depress one end of the slide as it passes under the cutters, so that the strip may be correctly tapered.

Any mechanic may with a little practice make perfect strips in this or a similar fashion, working to thousandths instead of to sixty-fourths of an inch. And, after all, is it any the less a hand-made rod because he cut the strips with a heavy and accurate machine and

not with a wobbling hand plane or file? If you make up a set of joints for a rod, working entirely with hand tools, would you refuse to prepare the ends for the ferrules on a fine lathe, on the ground that that was machine work, and whittle the ends to fit instead?

I am merely stating a case. Think it over. If you possess the skill and the equipment, try it. Otherwise, let us see what may be done with an improved plane. A great deal of very satisfactory work, I assure you; work that is absorbing, interesting to a degree, and in which you will find recreation and freedom from worry and care.

In Chapter XIV I favored the short, grooved block and the filing of the strips. My reasons for so doing was to give novices a very simple method. I believed then, and still believe, that a full length groove is better, but it is not every beginner that is handy enough with even simple tools to work in this manner. Making one groove for the strips for each rod joint requires time and care and should be considered a very important part of the work.

For this purpose I procured two blocks of hard maple from a mill man who assured me that the plank from which he cut them had been

"kicking about the shop" for years, and was, therefore, well seasoned. One was made a trifle over 5 feet long and the other about 3½ feet. The faces of each block are all 2½ inches wide and absolutely true, as they were machine sawed and planed. This gives spaces for four grooves, one on each face.

Taking the shorter block, with a pencil I drew a line the full length of each face, each line in the exact center. Then with a carpenter's gauge, passed back and forth a number of times, a clean furrow was cut. Then I procured a thin wood rabbet plane which had a cutter half an inch wide. This iron I ground down on each side on the emery wheel until it fitted exactly in the center gauge (60 degrees). Of course the bottom of the plane was planed off to the same angle.

Great care is at first necessary in deepening the original furrow formed with the marking gauge, for the narrow plane is likely to follow the inequalities of the grain of the wood instead of sticking to its proper groove. But after a fair start has been made, this difficulty is eliminated.

We will assume that the first groove is to be made ¼ inch in depth at one end, and ⅛ inch at the other. Therefore, mark ¼ at the

deep end, and ⅛ at the shallow end, and with a try-square and pencil mark entirely across the block at 6-inch intervals, putting the distances of each from the butt on one side of the groove, and the proper finished depth on the other. Your reference figures will in this way always be before you as you work. If your block be three feet long, it will be spaced as shown in Fig. 53.

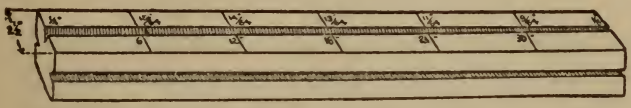


Fig. 53.—Maple Block with Grooves Cut on Three Faces. (The caliber marks are merely arbitrary ones to illustrate the idea.)

Now for a depth and taper gauge. The only reliable one for this purpose that I have ever seen was shown me by its inventor, E. R. Letterman, of the Chicago Fly-Casting Club. Mr. Letterman gave me permission to make one like his and to describe it for the benefit of fellow anglers. In making mine (Fig. 54) I departed from his model only in attaching the set-screw. For the base I used a piece of 1-16 inch hard brass (A). To this were riveted two strips of brass (C C) of the same thickness as the steel center gauge (B). The gauge may be had at any hardware shop

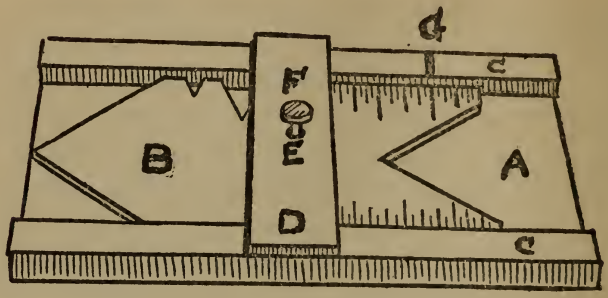


Fig. 54.—Depth and Taper Gauge.

for twenty-five cents. The cross-plate (D) may be of any convenient thickness. In its center drill a hole (E) and thread this to take the set-screw (F). The screw may also be had at hardware shops.

The width of the device from C to C must correspond with that of the center gauge, which, when in place, may be pushed up or down without side play. Push the center gauge under the cross-plate and turn down the set-screw when the point of the gauge is exactly flush with the proper end of plate A. Then mark across the strip C at G and exactly in line with one of the quarter-inch marks on the gauge. It will readily be seen that when the mark G is opposite the next quarter-inch line on the gauge, the point of gauge will protrude just ¼ inch. If the lower end of plate

is exactly at right angles with center of gauge, the device may also be used for clearing the groove in your block from dust, and in trueing it up while you are making it as well. I made my gauge considerably wider than Mr. Letterman's, so that it is of convenient form to hold in both hands while it is used as a groove scraper, and its wider bottom makes it more accurate in trueing the grooves.

The small end of groove is to be ⅛ inch deep. Therefore, do not plane that end deeper than 5-64 inch, but plane from the 24-inch mark to the large end, then from the 12-inch mark to the large end, and so on, gauging frequently. When the groove is approximately 3-64 inch shallower throughout than it must be when finished, lay aside the plane and thereafter use the scraper only. Set it at 7-64 and scrape forward and back until that depth at the small end of the groove is attained. Then scrape from the 30-inch station toward the large end, and so on, gauging often, until the depth at each station is 1-64 inch less than it should be. When satisfied that the groove is true throughout, the final scraping from station to station, with a change in the gauge for each, will result in a groove that is only a trifle less accurate than one made on a machine.

If this groove is for the strips of the butt joint of your rod, make another one for the middle joint, and a third for the tip, all starting from the same end of your block, and each one properly marked at each 6-inch station. Just beside the groove bore a hole through the butt of the block, and another one at right angles to the first one. The holes should be of a size to fit snugly over a short steel pin to be driven in your work-bench. This will steady the block while you are planing strips.

Finally, varnish all faces of the block, but not the grooves. This will preserve the pencil marks, so that it will not be necessary to renew them frequently, and will also prevent the plane from coming into contact with the hardwood block. After the varnish has dried, clear out the grooves with the gauge, to be sure that no varnish got into them. Any varnish that happens to be at hand will do for the block, and shellac will answer, though it is not very durable for the purpose.

It is some trouble to make a perfect form for the three joints of a rod, but after you have finished your first block and find it well made, you need not be ashamed to show it to your best friend. But there is only one way to go about the work: When you have

decided just what the calibers of your rod are to be, mark off three sides of a good block of wood, set down the calibers thereon, and then begin work on the grooves some day when you have nothing else on hand. Take it easy, go slowly, and call it a good day's work when the block is ready for the cane.

Take another full day for splitting and roughing out the strips for your rod. Try to believe that all you intend to do is to work out a sufficient number of rough strips, each one as perfect as possible, match joints and lay aside until another year each set of six. Of course you will not do this, but at any rate go very slowly, for the careful selection and matching of strips are very important steps.

Tonkin cane is the only material worth considering in the making of a first-class rod. The day of the Calcutta bamboo rod has passed, and it is best to forget that your grandfather ever made a good rod of that material. I doubt if any other amateur rodmaker has poked into more queer corners and out-of-the way places in New York City and its environs in search of Calcutta bamboo than I have, and for all the canes that I bought, carried home, and finally threw away I would not give one red stamp to-day. It would be a shameful

waste of two perfectly good cents. Tonkin is used by all first-class rodmakers, and although some of them may sigh for the good old days of the Calcutta rod, in the final analysis they will admit—albeit modestly—that they are making mighty good rods to-day. The truth is that their best rods are better by far than any that grandpa ever made of any material. What more, then, does any amateur rodmaker want?

Tonkin cane comes to our markets in bundles of two sizes. The longer canes are six feet or a trifle more in length, and the average diameter is about 1⅜ inches. The canes in the shorter bundles are about 3½ feet long, and their diameter is about 1 inch. These are used for tips or are bored and capped for tip tubes.

From the six-foot canes select at least three, being particular to pick those in which the distance between knots varies. As a rule the distance between knots is quite uniform, but I have seen canes which had only three knots. In some the knots are very close together near the root, and far apart at the top end. Of course, the shorter the joints of your rod are to be, the more latitude will you have in matching up the strips, but if you are planning to

make a 5½-foot bait-casting tip, the selection of canes will be a more important matter.

The darker the enamel of the canes, the better are they likely to be. Avoid all that are green, grayish-green or pale yellow. Seasoned canes are reddish-yellow, orange, or straw color, with no green tone whatever. When tapped with a stick they give out a good strong round ring, somewhat like a metal tube, whereas the green canes give forth a dull, flat sound.

Do not discard a cane merely because it is cracked, but if it has been crushed, avoid it. Grayish stains may indicate mildew, possibly from the hold of some leaky old ship, but irregular brown stains are sought by some makers, and are found on the strips of nearly all the best rods. This, I fear, is but a lame description, for I am sure that I can pick out good canes better than I can describe just how good canes should look. It is a good deal like picking out a ripe watermelon. Any country boy can do this instinctively, and yet he will find it difficult to explain just how he does it.

One thing more: You may not agree with me as to the color of seasoned and green canes because you have seen rods made up from canes showing decided greenish hues. This is

true, but that is not proof that the material used had been seasoned. I have also heard people complain that, whereas almost any 99-cent rod was made from "nice, clear, white cane," every high-priced rod was stained and dark and dingy!

In splitting the canes use the strongest knife you possess. There is nothing better than a hunting knife with a good thick-backed blade. Lay it across the end of the cane, so that you can split it in half, and drive the blade home with a wood mallet or billet, continuing until the other end is reached. Split all your canes in half before going further, then place each cane on your bench, with one end against something solid, and with a carpenter's gouge attack the knots inside the halves. A large gouge is better than a narrow one, as its curved blade will fit the inside of the cane better than a small tool. These knots are very tenacious, and it may be necessary to tap the gouge lightly with the mallet. Cut them out as smoothly as possible, but without cutting into the soft side of the cane. There are two good reasons for doing this at the time: it will be easier to go further with the splitting, and the rived strips will not need so much roughing on that side.

Next file all the knots on the outside of the canes, smoothing them down even with the enamel. You will find a cane or part of a cane now and then in which the wood curves down from the knot, so that it is difficult to obtain anything like a plane surface at that point. Mark such points with a blue pencil, and discard the strips carrying them after splitting. Such strips may be straightened by heating over an alcohol lamp and bending or clamping in a vise, but they are better out of the way.

On the inside of each half cane place such marks as will show on every strip taken from it, so that in matching strips you can surely identify each one as coming from a certain cane.

It is generally possible to split each half-cane into three strips, each of good width, but if the cane splits off to one side, as sometimes happens, do not attempt to force matters, but let it go at that, for it is always better to plane a thick piece down to size than to try to split to that size.

With canes that are well seasoned it is only necessary to start the knife with a smart blow, then push it down, the cane opening nicely far ahead of the blade and in a fairly straight line. But if it splits badly, going off at a tangent

or slivering, it is just as well to discard that piece for something more promising. Anyway, this is a case of selection, and not of making the available material serve the purpose. In making the butt of a salmon rod I split twenty-three pieces of good cane, but finally discarded every one of them as not quite up to standard, and finally split out twelve more strips of thinner material and after working them to shape, glued them in pairs and made the joint double enamel.

Thus far we have accomplished something, but have really not yet started to work, for we have no plane to work with. Any old plane will do? Not at all. There is only one type that is worth using, and it is worthless as it comes from the hardware shop, where the price is fifty cents for the plane, and about half as much more for an extra iron, which will come in very handy.

In 1889 Norman E. Spaulding contributed a very workmanlike article on rodmaking to the *American Angler*. In it he referred to the method of altering the plane iron to which I refer below. This impressed me, but it was not until many years afterward that I began to count Mr. Spaulding as one of my friends. Since then he has given me many

useful hints on rodmaking. He impressed me with the fact that the long, thin cutting iron of the small plane was almost useless for cutting Tonkin cane, but with the alterations he advocated the cutter became a sharp scraper rather than a plane, and it did not take me very long to find that his method was better than any other one that I had ever tried.

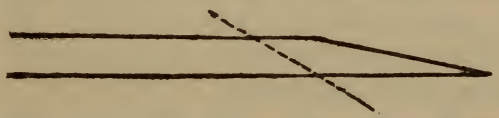


Fig. 55.—Dotted Line Shows Angle for Regrinding Plane Iron.

Purchase a Stanley No. 220 plane with extra iron. This is an adjustable iron block plane 7½ inches in length, and the width of the iron is 1¾ inches. If you cannot grind the two irons properly, take them to a grinder and tell him what is wanted. In Fig. 55 the shape of the cutting edge of the iron as it comes from the shop is given, while the dotted line shows the edge as it must be after grinding. The cutting face of the iron thus meets the bamboo at an angle of about 70 degrees—nearly a right angle—and becomes in effect a sharp scraper which will not splinter the cane nor bite into knots. Tonkin cane being very hard, however, it will be necessary to have

your oilstone handy, and hone the cutters frequently, for with this blunt edge a very sharp iron is a necessity as well as a joy.

This brings us to the rough work on the strips. As an aid I have found that a piece of pine board with a grooved edge is as good as anything. Fasten it in your vise and hold the strips in the groove while planing them. It is a good plan to plane the sides only at first, thus leaving the strips rectangular in section, and tapering slightly.

Select the best six strips for the purpose, and match them. Lay them all enamel up on the bench, first having marked on its top two lines, as far apart as the length of your rod joints when finished. Place the first strip over these marks so that the fewest possible number of knots will be between them. Lay the second strip alongside of the first one, and shift it so that its knots will not come very close to those on the first strip. By shifting the rest of the strips many times, or trying still others instead of some at first selected, you will eventually be able to match up six strips for the butt joint, with no two knots directly opposite each other. Mark across all of them in two places, and saw them, being careful that their length exceeds by at least

two inches the finished length of joint. Put identification marks on each strip, and lay them all aside.

Select another set of strips for the middle joint of your rod, and two more sets for the tips—that is, if you intend to make a spare one. It is sometimes well, however, to leave the tips until the last, for it is more than probable that you will reject some strips after they are partly finished, as not quite up to standard for butt or joint, and if these are not defective in any way they may be worked over for tips.

In all of this work of selection it is a good plan not to pick out for any one joint more than two strips from each cane split up, and one would be even better. From several good canes it is likely you will get a better set than if they were all taken from one or two. If two strips from the same cane are put in a joint, see that they do not lie on diametrically opposite sides, as the strips of a rod work in pairs, and each pair should consist of two perfect strips.

Mr. Letterman prepares the rectangular strips for the final beveling by drawing them through the large V in his center gauge. These gauges are highly tempered, and the

edges will cut like a sharp scraper. He fastens the gauge in a vise, bandages the thumb and fore finger of the left hand, to prevent cutting them on the gauge or the sharp edges of the cane, then draws the strips through the gauge. The strip is inclined slightly, to present a better cutting edge, and considerable pressure is exerted by thumb and finger. I have tried this plan with satisfaction and can recommend it.

If I were beginning all over again, I would use nothing in rod—and other—work but a micrometer caliper; but while I use one a great deal, in rodmaking I have been accustomed to using a gauge marked in 64ths of an inch, and to change would necessitate the correcting of a great many charts and working plans. There is one thing that will help materially, and that is to ignore all coarser designations under one inch and use 64ths alone. By this I mean to designate ⅛ as 8-64, and so on, the idea being to eliminate, as far as possible, the necessity for mental calculations of any kind while you are working. You may consider this point trivial, but let someone call you to lunch while you are on a delicate piece of work, and unconsciously you begin to rush things in order to reach a satisfactory stop-

ping place—and the result very often is a slip or something that will mar your work. That is one reason why the micrometer is so satisfactory; the marks are all in thousandths.

At first you will not be expert enough to attempt to bevel and taper a strip held in the grooved board mentioned, although you can readily reduce each strip to satisfactory shape in this way and by drawing through the center gauge. From this stage on, then, consult your micrometer or gauge often, noting at the same time the readings on your grooved block.

In using the block plane with scraper edge you can plane a strip from either end without the slightest fear of cutting into grain or knot. Therefore plane toward the butt end of your strips until they are of good form and size, then reverse them and holding the strip in the groove with left thumb behind the plane, work toward the other end, first on one side, then on the other, always being careful to see that the enamel face of strip lies true in the groove. And as the edges of Tonkin are very sharp, either bandage the left thumb or provide it with the thumb of an old glove, and in either case dip the member in powdered rosin frequently. Should you sustain a bad cut—and it is almost impossible to avoid this at first—

dip the injured finger at once into shellac, then into sawdust. By this treatment bleeding will be checked, and inflammation will not set in, to spoil your work for a week.

Of course it is wise to set the plane very fine, and to work slowly. Besides gauging frequently, test the strips often with your center gauge, to see that the angles are true. It is also possible to gauge them on all sides at the same time, but this requires a gauge specially fitted. Such a one was made for me by a fellow angler, J. E. Radford, of Hyde Park, Mass. This consisted of a caliper gauge with a center gauge so fastened across its face that the readings on the slide of the gauge were correct for each face. In use the strip is passed through the triangular opening and the slide closed. In a moment the strip may be tested and marked, if necessary, at any number of places throughout its length, and very accurate work is therefore possible.

When all the strips have been planed to nearly perfect size and taper, put them together, and with a length of string wind them spirally from end to end, exerting considerable tension meanwhile. Caliper on all sides from end to end, marking in your own fashion a place that is too high, too low, or too wide,

as the case may be. Take them apart again and correct the errors, rewind them, and so on until you are satisfied with the result.

At this stage it is well to have in hand a memorandum of the calibers of the ferrules you plan to put on your rod, and to work toward that end. Remember that the diameter of the cane on flat surfaces cannot be less than the inside diameter of the ferrule that is to go on it. It is better to use a large ferrule than one requiring filing the cane to fit.

Of course the work on middle joint and tip will be like that already described, but, contrary to the lay opinion, it is easier. When an outsider looks at a slender tip and is told that there are six strips in it, he marvels greatly, but with the system described it is not so very difficult to make tips after you have had some practice with the thicker and less wieldy butt strips.

Before you make the middle joint, glue up the butt, and perhaps that work will give you an idea or two that will help you in the subsequent work with the plane. At least it will show you that illy fitted strips will not be improved or hidden in the glueing, and that you have got to have them right before you cement up the faults past correcting.

There may be a better glue than Coignet No. 1, a French product that is called after the chemist of that name, but if so I am not familiar with it. Let it soak overnight in just enough water to cover the glue in the pot. At best glueing strips is a messy proceeding, but if you will go to a little extra trouble some of the unpleasant details may be eliminated. From the plumber's scrap-heap select a piece of pipe of any size and at least two-thirds the length of your rod joints. If one end is threaded, have a cap fitted to that end. This is your glue tank.

Glue the strips in a warm room, and have strips, glue, and temperature uncomfortably warm. Provide a large pail of boiling water, and when all is ready, pour the glue from its pot into the tube, set the latter in the pail of water, and insert the bundle of strips at least a foot into the hot glue. Holding the strips just above the glue mark, wind spirally with a piece of strong cord down to the glued end and two-thirds of the way back. Grasp the glued portion, unwind about three inches of the portion first wound, dip into the glue and hold there until all of the strips are well coated, and the chilled glue at the place of commencement shall have had time to be warmed up,

then resume winding toward the small end, dipping that end frequently, to keep the glue hot. When that end is reached, reverse and wind back to the other end, and tie off.

Roll the bundle of strips smartly back and forth on a table, to straighten them, but do not attempt to bend them, as every bend that is trued will put a kink into the strips somewhere else. Suspend the joint from a nail in a warm room for several days until the glue has had plenty of time to set, then remove the cord windings and scrape off the surplus glue. With a fine file go over each of the six faces lightly, then rub over all with an old piece of very fine sandpaper.

The corners should not be rounded, as this will take away part of the enamel, but they may be rubbed a trifle to remove the sharp edges. If the joint be straight, congratulate yourself; if not, pass it through the flame of an alcohol lamp until it is uncomfortably hot to the touch, turning rapidly while so doing, then true it up and it is ready for the ferrules.

For the sake of brevity, let us assume that your rod is to be a fly rod, and that you are particular that it be of a certain length. In order to determine the lengths of the three principal pieces, lay them on the floor, with

the ferrules beside them, and allowing for the ferrules, divide the known total length by three, and marking each joint, lay the three side by side and check up. Remember that the large ferrules are longer than the other set, and that the reel-seat will add a trifle to the length of the lower joint.

Provide a piece of clear white pine for the butt of the joint, shape it to fit inside the reel-seat, and bore it carefully, then glue it in place on the butt so that it will be a quarter-inch shorter than the reel-seat. Good quality sheet cork is nicest for the hand-grasp, and if you have no large metal tube handy to cut it with, cut it up in squares about 1¼ inches in diameter, then hunt up an old ferrule of proper size, file one end sharp, and cut holes in each square to fit over the joint. Do not try to cut the cork by hammering the cutter, but hold the latter in one hand and with a circular motion cut out the corks. When a sufficient number have been made ready, push them down, glue-coated, one at a time, to the reel-seat dummy, mismatching the squares so that no two corners will come together. Slide an old piece of heavy pipe down on the lot, and set the joint away in a corner until the glue is dry.

The grasp may be roughed out with a sharp knife until most of the corners are removed, then rub lengthwise with coarse sandpaper fitted over a wood block, then with fine sandpaper, turning constantly and calipering frequently to preserve the shape. Try the reel-seat now and then, and the winding check as well, and when the grasp is shaped to fit both properly, rub lightly with an old piece of the finest grade of sandpaper, and turn your attention to the ferrule.

Mark the cane at the point where the ferrule is to rest, then file off the corners from a point just above this mark to the end, being extremely careful to keep the cutting true with the axis of the cane. Of course it is far better to prepare the cane for ferrules in a lathe, but good work may be done without one. File and try until you are sure that the ferrule will go home with a little forcing, then heat your cement and the wood over the alcohol lamp, rub the cement on evenly, and warming the ferrule slightly, push it on with steady pressure until it is down to the pencil mark. If it is a split or serrated ferrule, wind the end temporarily with a bit of string, then cement the reel-seat on the other end in similar fashion and attach the winding check.

Good cement for this work may be had from dealers, but I have never found anything that will hold better than old, sticky shellac—just such stuff as you will find in a bottle that has been left standing a long time without a stopper. You may have to pry it out with a stick, but warm it and it will hold a ferrule in place until the cows come home. I have an idea that a trifle of plaster of Paris mixed with it will improve it, but have not as yet used this on a ferrule, though it will hold arrow piles nicely.

Procure a small section of hard German silver wire, and a twist drill, each 3-64 inch thick. Drill a hole in the reel-seat and down to the cane, fitting it with a suitable length of the wire, and file off the end flush with the surface. Mark a place at about the center of female ferrules, and toward the end of male ferrules, and securing the joint in a vise, drill carefully entirely through each ferrule, fit pins, and smooth off the ends. When a good ferrule is properly cemented, then pinned through, it should never work loose unless exposed to the drying incident to steam-heated places. Cement alone will hold most ferrules, and this method will answer for the beginner who may not be handy in delicate work, but all of the

best rods are equipped with pinned ferrules, and it is seldom indeed that one of them ever comes loose, even when kept in very dry places.

In selecting the guides for your rod, try to procure tops fitted with phosphor-bronze, or, failing in that, hard steel rings. For the hand guide agate is all right, though I dislike agates for fly rods for the reason that they are so easily broken. Bronze is better in every way, and as it is a so-called greasy metal, it wears but slowly, and to offset this the rings may be turned now and then and cemented with a drop of shellac. For the other guides, select bronzed steel snake rings, and have them a trifle large rather than too small, so that the line will render through them freely. It is a curious fact that the total number of guides for a fly rod is generally 13. May it be a lucky number with you.

CHAPTER XVI

WINDING RODS

THIS subject has been kept for a separate chapter in order that the various steps in rodmaking can be clearly understood, and to avoid repetition. Winding is a part of the work that can be done at odd moments, on a rainy day or in the evening, though I would not advise night work with colored silks, so trying are they on the eyes.

Let us assume, then, that you have finished a rod—its type does not matter, as the winding is similar for all rods—and that it has been rubbed lightly with varnish and hung up until absolutely dry.

The first things to consider are the guides. If the bait-rod is for accuracy casting or for fishing, the hand guide—the first one above the reel—will be placed nearer the reel, and more guides will be used than on a rod intended for distance casting only, on which two or three guides only will be used. For fly-rods the

position and number of guides depend upon its caliber and length.

Take up the guides one by one and file the upper edges of the bases, so that the silk will not be cut by them in winding; then, with a few turns of common thread, tie each one on the rod and true them all up by sighting through them from both directions. To assist in their alignment tiny shallow holes should be drilled in both ferrules, so that in putting the rod together it is merely necessary to seat the ferrules with the two marks opposite in order to align the guides perfectly. This applies to all rods.

On bait-casting rods for tournament work alone, it seems best to use only two guides, so that the hand guide must be three feet or more from the reel, the distance between it and the second guide being slightly more than the distance between the second guide and the agate top, in order to insure the least possible friction on the line.

If you are particular to have the windings as handsome as possible, putting them on without wax will tend to preserve their color, if they are carefully coated with shellac before varnishing. On a rod whose preliminary coat of varnish is still a trifle soft, yet not tacky, un-

waxed silk will adhere nicely when it will not on hard varnish. Provided the silk is treated with absolutely colorless wax in clean hands, it will keep its color fairly well, but after the first two or three windings are put on and coated with shellac, the tyro will understand why dark shades of silk cannot well be used. For example, dark green silk, waxed but not shellacked, will turn almost black under the varnish, and red turns a dull shade. Wax causes the silk to grip the wood firmly and it waterproofs the wood in places where there is only one coat of varnish. Still, there is no necessity for waxing the silk.

A split cane rod, properly made and cemented, can be used without windings, provided it is not exposed to actual soaking. Following this line of reasoning, some rodmakers hold that winding a rod does not strengthen it materially. This may be true of rods whose windings are spaced 1½ or 2 inches apart, but if these are placed one inch or less apart they do strengthen the rod. A rod that is soft in action may be strengthened by close windings or by winding continuously from end to end in spirals, provided the latter are spaced about one thirty-second of an inch and not put on solidly.

If you are in no hurry it is well to make the windings on the butt of split cane rods narrow, say twelve turns each, but space them about 1¼ inches apart, with six or more windings ½ inch apart next to the ferrule. On the joint make the spaces one inch, with a similar cluster next the ferrules, and vary those on the tip from ¾ to ½ inch. I am a firm believer in closer windings near the ferrules, to strengthen the strips there against damage in twisting—not that ferrules should be separated in any other manner than by a straight pull.

It is safe, but not always advisable to wind in spiral form, provided the spirals are not so close together as to come under the descriptive term "solidly wound"; for solid winding renders a rod soft in action, loading it down with a non-resilient sleeve filled with varnish.

I do not advocate continuous spiral winding, but I believe in stiffening a rod in this manner if the need arises. The plan I have followed with satisfactory results is to start winding in the usual way, but after completing ten or a dozen turns, instead of cutting the silk and pulling the end under, I follow the "band" by winding spirally—each turn about

1-32 of an inch from the next one—for an inch or more, then winding solidly ten or twelve turns, followed by another inch or two of spiral winding, and so on to the first guide, where the silk ends. Another series of bands and spiral windings is begun on the opposite side of the guide, ending at the second guide, or the ferrule, as the case may be.

This spiral winding calls for two or three coats of varnish, which should fill the interstices between spirals, so that the surface will be smooth, as otherwise a knock or rough handling will break the single strands of silk. The bands alone are coated with shellac.

As previously stated, I have great faith in the conclusions arrived at after long experience by Frederic M. Halford. He advocates winding fly-rods closely, from one-half to three-quarters of an inch apart. In his opinion this increases the steely spring of a split cane rod and strengthens wood rods appreciably. He does not state how wide these windings should be, but it is assumed that they are narrow, say seven threads in width, since wider ones are unsightly.

When your rod is ready to be wound, your hands being perfectly clean, lay on your work table a small spool of buttonhole silk, the silk

to be used in winding, a bit of wax, a pair of small scissors, and a very sharp knife. From the buttonhole silk cut a piece four inches long, wax it, lay the ends together and draw it through the fingers until it will lie straight with the looped end ready for use. We will call it the pull-through.

It is assumed that your silk is not waxed, and that you take up the butt joint of your rod, the first winding to be put on just above the metal taper of the handgrasp. Lay the silk along the rod, hold the end with the left thumb and begin the first circle, toward the right, turning the rod toward the left mean-

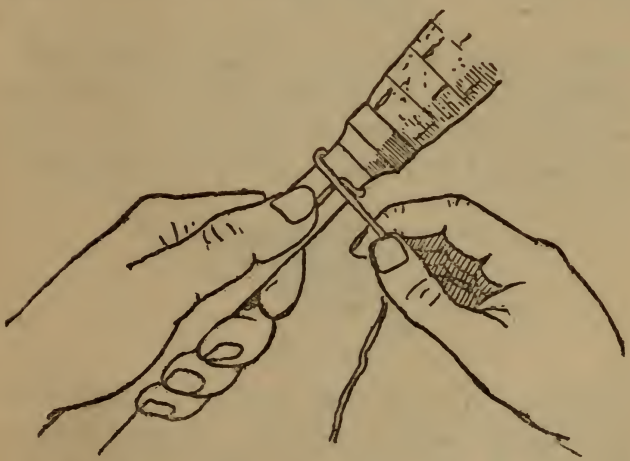


Fig. 56.—Method of Attaching Winding at Beginning.

while. This will bind the end of silk, as shown in Fig. 56. Turn the rod slowly toward the left with the left hand, holding the silk tight in the right hand, which guides it. Draw the silk as tight as possible during the first three turns, so that it will adhere to the rod.

If you wish to make ten or twelve circlets, after the sixth one lay the pull-through (*d* Fig. 57) along the rod, loop toward the left, and

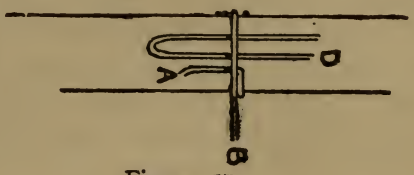


Figure 57.

wind over it, as shown in Fig. 60; but if the winding is to be narrow, the pull-through should be inserted at the beginning. This step is illustrated in Figs. 57 and 58. Count each

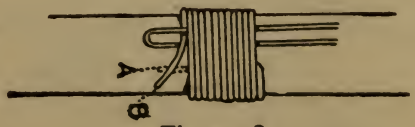


Figure 58.

complete circlet, at least at first, in order that all windings will be uniform. At the end hold the wound silk under the left thumb, cut it within an inch of the thumb, tuck the end (*b*

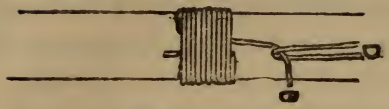


Figure 59.

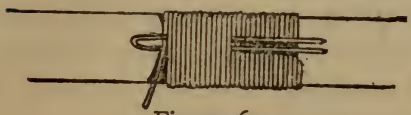


Figure 60.

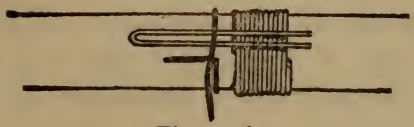


Figure 61.

Fig. 58) through the loop of the pull-through and draw the latter under the winding, the end of silk following as in Fig. 59.

When the pull-through is free, pull on the end (*b*) of winding silk until it is tight, then shave it off even with the winding and cut the original end (*a*) even with the last circlet of silk. (This is often cut after the fifth or sixth circlet.) Fig. 61 illustrates the method employed in making a narrow border of say, red, for a wide band of say, green. The figure shows the wide green band finished and the first stage in winding the border. In this case the original end of silk (*a* Fig. 59) is not cut off until the border is finished, as it helps to hold both bands together. The pull-through

is inserted at the beginning of the border winding, and used in the same manner as illustrated in Fig. 59.

This method of manipulating rod windings is the simplest one of several for making so-called endless windings. It is capable of numerous variations, and it is not only easy to learn, but insures satisfaction.

The secret of the method is to keep the pull-through of buttonhole silk well waxed, and to discard it for a new one whenever it shows wear.

In all books on rodmaking more complicated forms of winding are described and illustrated. The first step is alike in all of these, but their authors describe the finishing step in other ways. The most common form consists in laying the winding silk along the rod, so that long spirals can be passed over the end of the rod and drawn taut, then the silk is pulled under in the same way as described by me, save that no separate pull-through is employed. If one is winding near the middle of a long joint, this method is tedious in the extreme, and the silk not only snarls up, but becomes frayed. There is a way to partially overcome this, which consists in first winding backward in long spirals, pass-

ing tne end under these, winding tight, then pulling the silk under; but it, too, is tedious.

Many years ago I discarded these methods for the separate pull-through, and have used it in all windings since then. It may be ancient, but I have never seen it described in any work on fishing tackle.* It is, however, one of the most useful of all wrinkles, and is particularly handy in splicing silk lines. With this pull-through fancy windings of only two or three turns of silk can be so neatly made that only after minute inspection can the blind ends of the silk be seen. Indeed, I have heard anglers assert that such windings had been pasted down with shellac, and only after inspecting them with a magnifying glass were they convinced that the silk ends were actually pulled under and cut off.

I have examined split bamboo tournament rods in which the lower strips had given way through hard usage, but the narrow bands of silk had held so firmly that they were all rup-

*In reviewing "Rodmaking for Beginners," Hugh T. Sheringham, angling editor of the London *Field*, said, among other things: "Here and there he gives some very sage advice of general application, and some admirable hints. Among these may be mentioned his system of finishing off a whipping by means of a 'pull through,' quite one of the most useful things we have seen for some time, and one which we do not remember to have seen elsewhere."

tured at the line of the break, the ends remaining unmoved. This also shows the strength of silk windings, however narrow.

Different persons wind rods differently. My way may not be the best one, but I will describe it. I begin with the butt joint and place a rather wide band of, say, green, with a narrow red border next to the handgrasp taper, then a similar band on each side of the ferrules and at the top. After that I wind the guides with, say, green, with narrow red borders. This leaves only red silk to finish, and enables you to evenly divide the remaining spaces to be wound. The space between the handgrasp and the first guide is measured. Mark off every 1¼ inches from the guide down, and if you like finish up with eight or ten five-turn windings just ahead of the first band at the taper, for ornaments. Wind the red bands, then mark the spaces between the two guides, or hand guide and ferrule, wind there, and so on. So long as all spacing is uniform, any necessary variations will not be noticed, but as a general thing make the spaces closer and closer toward the tip, and if there is a separate tip, place its guides and windings so that it will match its fellow tip.

At first one is inclined to make his windings wide, believing that they are handsome so;

but as they are not necessary, it is well to make them all ten or twelve turns, with still narrower ones next to the wide bands covering the guides, and at the ends of the joints. Red being a lasting color, it is well to use it throughout, with light or medium green for borders. All red without ornaments requires much less work, but is not so neat as if there is some relief. If you object to colors, use cream or light yellow silk, which will hardly show on bamboo or dagama. For bethabara red is standard. Green alone or as a predominating color lacks taste, although it comes out well for narrow borders with red. At one time I happened to see a spool of lilac silk while winding a rod, and tried it. It looked so neat at first that I used it throughout the rod, using apple green for borders. The rod was a good one, but I couldn't stand those colors, and gave it away to a fisherman in Canada. Somehow the colors "got on his nerves," too, and he in turn gave the rod to an uncle whose vision was poor. I trust the old gentleman does not consider it a hoodoo rod, as his nephew and its maker did

There is a sort of unwritten law among rodmakers to use heavy winding silk on large rods, and so on down to the finest silk for light fly-rods. It is well to follow this rule

so far as may be possible. On tarpon, heavy salt water and trolling rods, on salmon rods and on the butt joints of heavy fly-rods size A is the proper thing. It is the commercial size that can be obtained anywhere. Size O is suitable for joints, size OO for tips of most rods, and for light fly-rods. One reason for this is that on tips the heavier silk is likely to be cut through by the line as it shoots through the guides in casting the fly, whereas the finer silk windings may be unaffected. On tournament fly-rods, when the line is coiled on a platform that is covered with grit, it is not unusual to see the windings of tips cut through as if with a dull knife.

Smaller silk than A is difficult to obtain of the retail trade, but there is a way to so utilize A silk that it will answer every requirement, with a lasting supply always at hand in the nearest dry goods store. This method follows:

Having selected the colors desired, wind the guides and ferrules—if the latter are split or serrated—with size A. If the ferrule and guide windings are to have borders of another color, leave these until the last thing. Take a spool of A and cut off a piece a foot long and rub this carefully with wax, which must be colorless and free from foreign matter that

will darken the silk. Twist this piece of silk in the opposite direction to that followed in its manufacture, so that the strands will separate, and hold them apart until each one of the three can be removed and laid aside. Now take up one of the strands and wax it thoroughly. It will remain a trifle kinky, but that will not matter. After it is waxed, it will cease trying to snarl up, as at first, and you will have a really strong thread of silk floss much softer than the three-ply strand from which it was taken. Try it on the thin tip of a fly-rod, and you will notice that in winding it will lie flat and spread out a trifle, like a ribbon, while it will not look so lumpy, even as a thread of OO silk, and after the rod has been varnished the windings will be very neat and workmanlike

It is obvious that this thread is not as strong as three-ply, and it should be tested to determine how much strain it will bear without breaking. It is stronger, however, than would be supposed, and I have wound a fly-rod tip with separated strands of O without breaking more than three all told; so that the A strands will give little trouble on this score if properly waxed.

Of course, in employing this method, you cannot work from the spool, but must cut off

suitable lengths and wax and separate the strands before beginning to wind. This is more tedious than employing silk direct from the spool, but you have the advantage of preparing the material for several windings at one time, and a little experimenting will determine how much to cut for certain work. A strand fifteen inches in length will make four or five narrow windings for a fly-rod tip, but for the joint and butt much longer strands will be necessary.

Because of the flat, ribbon-like form of the separated strands, fewer turns to each winding will be the rule than if OO were used; but the silk is so thin when tightly wound that no objections can be raised to its bulk. Given a coat of shellac on the silk only, and the entire rod then coated with the best light coach varnish, put on while warm, the rod will be a work of art, and a finger rubbed over its length will barely feel the windings.

Finally, the thinner the silk employed in windings, the less will they be cut and frayed by the fly line. A great many of the hard enameled fly lines break, or, rather, the enamel breaks in places if much used, so that the line is not smooth and wiry as when new, and such lines wear the windings rapidly, particularly

those in which large sizes of silk are used. I have seen new tournament fly-rods with every winding on the tips cut entirely through after a few days' use, necessitating considerable expense in renewing windings and varnish; but this is often due to insufficient varnish in the first place, or to coating the rod with shellac instead of good varnish. It is much less trouble and cheaper to shellac windings, rod and all at one time than to shellac the windings, then varnish over all, two coats; but it is not so satisfactory to the owner of the rod.

CHAPTER XVII

VARNISHING RODS

WHEN your rod has been wound, it is well to take up each joint, and while turning it rapidly, pass it over an alcohol or gas flame to remove all fuzzy ends of silk. Be careful that the flame is not close enough to scorch the windings, however. If any ends of silk protrude, cut them off short with a sharp knife.

Now warm your grain alcohol shellac slightly, so that it will flow well, and with the thin, round artist's brush previously referred to, coat each silk winding evenly, being careful to keep the shellac off the wood. As a rule one coat on the windings will be sufficient, but if the silk seems to be dry and dull after the first coat has dried, go over it lightly a second time, and let the rod dry for several hours. Because the shellac seems to be dry and hard on the surface of the windings after an hour, do not take it for granted and go ahead with varnishing. Shellac dries on the surface first,

and if two coats of it are put on windings, it is well to let them dry for a couple of days before attempting to varnish.

When you take it up again, go over the wood with a piece of flannel or linen, rubbing lightly but thoroughly to remove any wax, grease or oil that may have accumulated there during the winding. This is absolutely necessary to the attainment of a nice finish, and after the shellac on the windings is hard no harm can be done by polishing the wood with a strip of soft cotton or silk, bootblack fashion. To do this hold one end of the joint against something firm, to prevent turning. While it is not necessary, the shellac can be warmed slightly over a flame at this stage and the joint turned while a finger is passed around each winding to smooth down any uneven surfaces. After this do not touch the wood or windings with your hands; pick it up by the ferrules instead.

When you are ready to varnish, select a warm day if possible, or at any rate one when the air is not humid or moist. The rod should be warmed in a room where the temperature is 75 degrees, and your can of extra light coach varnish should be left for ten minutes in a pot of steaming hot water, to be sure that

it will be thin and all particles of gum contained in it will be melted so that it will flow nicely and dry rapidly. A warm rod and hot varnish will insure a nice finish.

For your work it is assumed that you have procured a flat brush of good quality, and that you are ready to begin by holding one end of a joint on a table and the other in your left hand. With a modest quantity of varnish, pass the brush from the top down for four inches, turning the joint slowly while the brush is held at an angle of about 20 degrees to the rod. Work very slowly, and in going over each winding see that a bare spot is not left there, caused by the brush skipping over the silk and missing the wood just beyond. To prevent this it is sometimes advisable to pass the brush around the rod at each winding first, then, when the varnish in it is nearly exhausted, go over that part lengthwise, to insure an even coating. At any rate, great care must be exercised to prevent daubing the varnish on in places and skipping others.

The first coat should be worked in, with no attempt to flow the varnish on, and be careful lest varnish accumulates around the guides, and leaves them gummed up and unsightly. The same care is necessary with reference to

the ferrules. To avoid marring them, pass the brush around the contiguous winding very slowly, coating the silk but not encroaching on the metal.

When all the part of the rod are varnished, if they can be assembled and the rod suspended in a fairly warm, dry room, free from dust, for two or three days, all should be well. A brad driven in a picture moulding is ideal, provided the rod does not hang close to the wall, but the center of a room is a better place, as some walls are cold, even damp, and on the side of a rod hanging close to such a wall the varnish may crawl and spoil your work.

In spring or summer it is usually safe to varnish a rod in the morning and suspend it in a window. The morning sun is not too warm, but it is often too warm after 10 o'clock for the best results. Plenty of fresh air is best, but a windy place should be avoided, as dust is likely to be flying there. Do not leave separate joints, while they are drying, where careless persons may accidentally knock them over or break them, and see that they are kept indoors at night. Do not touch the varnish with the hands.

Perhaps you will be satisfied with one coat

of varnish. If it is evenly applied it will be sufficient for split bamboo rods; but coach varnish applied while warm is not very thick, and a light second coat will keep out moisture. The first coat should set in four hours and be hard enough for a second coat in less than a week. The second coat, however, should be given as much time as possible to dry and harden before the rod is used, depending on the temperature. This coat can be deferred with safety until the middle of the season or even until the following winter if the rod is not subjected to hard usage; and if it is still in good condition, the new varnish will make it like a new rod. For hard use, however, two coats of varnish will not be wasted, but three will not be needed.

If spar varnish is to be used—and many salt water anglers employ it—three coats, with several days between, will be necessary.

Cord-wound handgrasps should be given two coats of shellac and one of coach varnish. More will be likely to render the cord slippery. If the grasp is sumac, omit the shellac and put on two coats of coach, giving it ample time to dry.

THE END